



FRIDAY, JULY 21.

MASTER MECHANICS' ASSOCIATION.

Reports and Discussions.

We continue this week our summary of the discussions had and the reports and papers presented at the recent convention of the Master Mechanics' Association.

CAST-IRON FOR LINKS AND BLOCKS.

The following question was submitted by Mr. Fry: "Is cast iron a safe metal for links and link-blocks?"

THE PRESIDENT: I want to make a speech on that subject—yes.

Mr. WILDER: It has been our practice for the last eight or nine years to use cast iron for blocks entirely, and for the past two years we have been using a cast iron link, and for about a year past we have been making those links of cast iron and chilling the inside face, and so far I have never known a link to break, and I find the wear is very much better than with wrought-iron links, case hardened.

Mr. FAXSON: We have a class of engines, which we call, I think, Class E, which have cast-iron links with chilled faces and cast-iron blocks. We have never had any trouble with them. Whatever breakage they have had, was breakage which I think would have occurred with the wrought iron link.

Mr. WILDER: We make the cast-iron link to take the place of the wrought-iron link in every way. We use them on all classes of our engines, wherever we are building new ones, and in all cases where we have to put in new links we have put in cast-iron links.

Mr. RICHARDS: We have used cast-iron links for 28 years on a good many engines. I never had one fail, excepting where some other part broke first. They are very little heavier than wrought iron. When the locomotives are thrown away, the links are sometimes used for another pair of engines.

Mr. WILDER: I have put up engines with cast-iron links and blocks on one side, and wrought-iron in the ordinary way on the other, and after two years wear there would be a perceptible amount of lost motion in the wrought-iron block and link, while the cast-iron links did not need repairs of any kind.

STANDARD WIRE GAUGE.

The report of the Committee on this subject was printed in the *Railroad Gazette* of June 30, page 391.

Mr. FRY: If I understand the recommendation right, it is simply this: That in specifying sheet or wire we state exactly what we want. If we want half an inch thick we say half an inch thick, and so on; and there is no room for doubt as to whether we mean Birmingham wire gauge, or Stubbs' wire gauge or some other wire gauge. Unless some gentleman can show us that there are differences that cannot be measured; or that there is some insuperable objection to ordering metal in that way, the good, sound common sense of the recommendation is such as I think will commend itself to us all.

Mr. FLYNN: I think it is essential that we adopt some gauge to be known as the American Standard Gauge. You can call it the American Micrometer Standard Gauge, or give it the name of this Association; and whatever the gauge is, it ought to be well published to the American world at least that that is the standard gauge of America. Because if you do not so publish it, that old system will still be in existence, and it is extremely necessary that we should get those engaged in the manufacture of sheet iron to recognize that as the standard gauge of this country. We will thus do away with Stubbs' wire gauge, the Birmingham wire gauge and all those gauges, and adopt a system of measuring exactly the thickness you want the iron.

The only thing I want to impress upon the minds of the members of the Association is this, that such a course should be adopted as will make the gauge decided upon the standard gauge of the country.

Mr. BRIGGS: On the micrometer gauge is a little column upon which are divisions, and each division represents $\frac{1}{1000}$ of an inch, or $\frac{1}{10}$ you may term it. On this standard is a little revolving cylinder, on the bottom of which are divisions. You will find twenty-five divisions on that little cylinder. You turn that one division, and that lifts the screw exactly the one-thousandth part of an inch. A person having a very good eye can turn up a half of that and get a most accurate measurement of one two-thousandth of an inch, and so on less than that. It is as simple as can be; you cannot make a mistake. You have a little set screw there which you can set to as fine a gauge as you want to work to. After a certain amount of wear has taken place, the mode of adjustment is to bring the zero mark around to a line, and it is just as good after ten years ordinary use as it was the day you got it.

Mr. FRY: I suppose if we decide to order iron by measurement it would be at the option of the rolling mill to take any measuring machine they liked. If we ordered iron a thousandth of an inch thick, and the manufacturer gave us iron a thousandth of an inch thick, it would make no difference whether he measured it by a two-foot rule or an ordinary gauge, if he could prove that he gave us iron a thousandth of an inch thick. But if we know there is an accurate measurement easily obtainable, and we order our iron by measurement, we can then, in case any misunderstandings spring up, easily settle them.

Prof. SMITH: I have had experience in ordering several thousand tons of plate iron. I soon learned that I had to order it by specifying the weight per square foot, telling them that I would not pay for any more.

Mr. BRIGGS: In our report are shown the differences in the same gauge all over the country. One man may have a gauge that he uses twice a week; another may have a gauge of the same kind that he uses fifty times a day; how are you to prove which of those gauges is the truer. The object is to have something that is positive, let it be called a gauge or a measure or what you please.

A MEMBER: Only last week I was ordering some copper to place around some flues. I ordered sixteen copper and it went into my gauge easily at eighteen. Mine was a comparatively new gauge and theirs was a gauge which they had been using in the store for iron and copper and wire for fifteen or twenty years probably. They were both Stubbs' gauges. Probably the sizes between 16 and 18 were the ones that had been used the most.

Mr. SETCHEL: It seems to me that to adopt any particular gauge leaves the matter where it was before. The gauges may not be right; but the thousandth part of an inch is the thousandth part of an inch, and if we say to a manufacturer that we want a piece of sheet a thousandth part of an inch, it must come that way. We simply say we

will adopt that as a unit of measurement and order by it, and that settles the matter for all time.

The recommendation of the committee was accepted and adopted by the Association.

STANDS FOR BOILER ATTACHMENTS.

The PRESIDENT introduced this subject by calling attention to Mr. Forney's suggestion, made at the Providence meeting last year, that it was desirable to reduce the number of holes in boiler heads, and to prevent, as far as possible, the escape of steam into the cab in case of accidents. He added that Mr. Powell had designed a steam gauge stand, with injector cocks, steam gauge cock, blow-cock, brake-valve cock and oil cocks, all in one casting.

Mr. HOLLISTON: I designed for my own use a stand to perform the same purpose that that does. It has a valve closing upward, with a screw stem running down, and the valve is opened by drawing down the stem. The disposition of the metal in the stand is such, that they break off in case of accident just below the valve stem.

Mr. JOHANN: We introduced a valve and constructed the attachments in such a way that in case of accident it has to break at a certain point, that point being made the weakest part of it. In the case of a rear collision where the caboose got on top of the engine and took the cab off and took this stand with it, the valve acted so instantaneously that there was no disfigurement of the boiler head from steam or water.

BEST POSITION OF CHECKS FOR PUMPS OR INJECTORS.

THE SECRETARY read a question submitted by Mr. Woodcock: "In what part of a locomotive boiler should checks be placed either for pumps or injectors to produce the best results?"

Mr. WOODCOCK: I believe in uniformity as far as we can reach it. Every one of us must have noticed the different positions in which the checks are placed on our boilers. I ask this question of those who have had experience in this line, merely to get at the point where we can get the best results. Our injector men tell us to make the branch pipes as short as we can—some of them at least. The practice is various. The check has been placed forward of the first cross; in the centre seam of the first sheet next to the slope; on the leg of the fire-box, and in other parts.

THE PRESIDENT: I would like to ask if there is any member who has had experience with putting water into the leg of the boiler from the injector, and if so, if he has experienced any injurious results. I can say, gentlemen, that I see one objection which I think is a very serious one, on a great many of your Western roads that have lime water to use in introducing water any where near the fire-box. I suppose it is a fact that the greatest amount of lime deposit is about the entrance of the water into the boiler when it first strikes water and heats it up to a point where it precipitates the lime. That lime will adhere to anything it touches. Consequently it might be bad practice to introduce water near the furnace. If it is better to introduce the water forward, it is well to know it. If it is not, we can by putting it back save pipes from breaking from vibration. In fact, it is almost impossible to fasten them so that they will not vibrate, and it would be better to shorten the pipe if it can be done with safety.

Mr. FRY: I believe there are two reasons for putting the water in at the front end of the boiler that have weight with our locomotive designers. It is evidently convenient to put it into the front end when we have pumps, but in addition to that, it is considerably better to put cold water in at that portion of the boiler where the heating surface is coldest, so that the differences in temperature might be greatest and the best effects in radiation might be produced. I am under the impression that has had great weight with those who have considered the best place to put the check. When I was last in England an American master mechanic, Mr. Wusdell, the Superintendent of the works at Crewe, called my attention to a method of putting the water into the injector, which does away with the long copper pipes and obviates the making of a hole in the front end of the boiler, which Mr. Forney has called our attention to, as being a very bad practice, and at the same time delivers the water where we want it. This method is to put the check on the back head and to carry a pipe over the crown sheet and deliver the water about where we deliver it now. This is a very cheap arrangement, and keeps the pipe out of sight.

Mr. HAYES: In 1852 I built a number of engines and introduced the water at the back end of the boiler with the pipe running inside, but I found that the pipes soon became filled up with deposit, and when I brought the engines into the shop to examine them I found the pipe lying down in the bottom of the boiler and we had to abandon it and run the pipes forward on the outside, and I think you will find that that will be the result to-day if you use water strongly impregnated with lime.

WELDING TUBES FOR LOCOMOTIVE BOILERS.

THE PRESIDENT proposed the question "What is the best method of welding tubes for Locomotive Boilers?" and said that he still welded by hand, but was anxious to know about the machines which had been devised for the purpose.

Mr. FRY had seen in use two machines for welding boiler tubes. One is a steam hammer, in the shops of the Chicago & Grand Trunk Railway. This has been in use for five years constantly, does its work rapidly, and so well that the hydraulic test has been dispensed with for tubes welded by it. There is also a considerable saving in the use of it over hand welding. The other machine is in the shops under the charge of Mr. Sedgley. It is a roller. It seems to be just as economical and efficient as the hammer.

Mr. SEDGLEY: We have used a welding machine for two or three years. It does all the work, cuts the tube off, scarfs it and welds it. It will weld about 100 tubes a day at a cost of probably two and one-fourth cents per tube for labor. The work is so well done that no hydraulic test is applied.

Mr. PRESCOTT: We are using a machine like that used by Mr. Sedgley. We have welded 220 tubes with it in a day. The cost is but seven cents a flue to take it out, cut, weld and replace it. The work is very well done.

Mr. FRY: The cost per tube given me for the steam hammer was also seven cents. The machine is probably not in the market.

Mr. PRESCOTT: The machine I spoke of is sold for \$600.

Mr. HACKNEY: I have two of those machines (the rolling machine) in use and all that has been said of them I can endorse.

Mr. SEDGLEY: The machine is made in Cleveland. I will be glad to give information about it at any time.

WEBB'S COMPOUND LOCOMOTIVE.

(Summary of paper read by Mr. David Joy, of London, Eng.)

Gentlemen: My subject is the Compounding of Locomotives as it has been carried out by Mr. Webb, the Chief Superintendent of Motive Power of the London & North-western Railway Co. The question of coal or coke consumption has with us in England always been a very serious one, so that all devices for economizing fuel have received much practical attention.

Undoubtedly many of you are aware that in England a few years ago a commission was appointed to investigate and report upon the coal fields of England, and on this re-

port to found an opinion as to the probable duration of the coal supply. I do not remember the exact figures, but the date of the exhaustion of the supply appeared to be uncomfortably near.

In presence of this contingency it is no wonder that devices innumerable have been before the English public claiming to accomplish all that was required in the way of economy, but on the principle of the survival of the fittest, our English locomotives have retained nearly the old form in which they appeared 30 or 40 years ago.

The experiments made in France and Germany in the compounding of locomotives have been before you in the mechanical papers. My province is to tell you all I can of what has just been done in England, and then to answer any questions that may arise thereon so far as I am able.

About three years ago, when I first introduced my valve gear to Mr. Webb, he told me that he proposed to build a compound locomotive, with a view of economizing the consumption of fuel, basing his expectations on the great saving that has in recent years been made by the introduction of the compound system for the engines at sea.

With very cautious and measured steps has the investigation of the question and the designing of the details been carried out, resulting in the engine of which blue prints and photographs are now before you.

Of this engine and the peculiar object aimed at by the divergence in its construction, ordinary practice, I will now endeavor to give you a short but I hope clear description.

If you are at all acquainted with the standard express engine of the London & North-western Railway you may fairly say on first sight of the photograph before you that the new engine has been a very slight departure—in appearance at least—from the standard type. Such in reality is the case, and this is a great advantage, the real difference being in one of total alteration of principle.

But as you will readily see, if with the altered principle the details can to a large extent be retained, the change is not such a one as to prohibit or in fact militate against the introduction of the new principle.

In the new engine the same boiler, wheels, frames, and to a large extent valve gear and other details are retained.

Now to describe the engine. As I have said she has the outward appearance and wheel bearing of the ordinary four coupled express engine. Only the trailing pair of wheels are not coupled to the driving wheels (using the usual nomenclature) but are driven independently by a pair of outside cylinders $11\frac{1}{2}$ in. diameter and 24 in. stroke. These are fixed to the outside frames just in front of the driving-wheels, where the sand boxes are usually placed. The motion bars are carried back beyond the driving wheels to a bracket from the frame, and these carry the valve and reversing gear, which is of the Joy type.

This pair of wheels so driven have their cranks set at right angles, and so far we have an outside cylinder engine with single drivers behind the fire-box, but the exhaust steam from these cylinders is passed through a receiver formed of copper pipes surrounding the inside of the smoke-box, where it takes up the waste heat from the tubes and then passed to the low pressure or expansion cylinder, the dimensions of which are 26 in. in diameter and 24 in. stroke. This cylinder is placed in the usual position for inside cylinder, viz.: under the smoke box, and by a single throw crank drives the middle or driving wheels, the Joy valve motion being here also used.

Thus both pairs of wheels are independently and separately driven, and thus are combined all the advantages of the coupled engine with its disadvantages, and all the advantages of the single engine without the disadvantage of its liability to slip. In fact, for all practical purposes, you have two single engines coupled by the steam between them and by the rails beneath them. You also save the coupling rods, with all their attending evils, the liability to break at high speeds, rigidity and harshness in running around curves, causing skidding of either inner or outer pair of wheels, and so aiding friction, the great source of all wear and tear and the prime cause of the necessity of repairs.

Next, as to the handling of the engine. This is practically not different from that for the ordinary engine. There is not the least difficulty in starting, as the two high-pressure cylinders have their cranks at right angles, so far as the engine is in the position of an ordinary locomotive; but there is in addition a valve at the command of the engine-runner by which he can at will admit live steam direct to the low-pressure cylinder, thus giving him three cylinders to start with, though this is not found to be at all necessary. Meanwhile the first exhaust from the high-pressure cylinders passing at once to the low-pressure cylinder on the enlarged area of piston, the full power of the engine is at once developed.

This power being divided between the two pairs of wheels, there is no more tendency to slip than with the ordinary four-coupled engine with the same weight on the wheels; indeed, much less, for continuous slipping is checked by each set of cylinders controlling the other; thus, if the wheels driven by the high-pressure cylinder slip, they at once, exhausting into the low-pressure cylinder, check themselves by back pressure, while the surplus power thus passed over to the low-pressure cylinder, if enough to cause slipping, quickly exhausts that pressure, and thus a balance is secured, and both sets pull equally, the action taking place being really an automatic preventive of slipping.

We now arrive at the main object in the designing of this engine, namely, the saving of fuel, which, as I have said, is with us a precious commodity.

When I left England at the end of May last, this engine, after some desultory general work, had been working continuously during the month of April running the Irish mail on the London & North-western Railway, the train usually, from its speed, called the "Wild Irishman," and scoring to the end of April about 7,000 miles. Its daily work from Crewe to London and back is about 336 miles. The average load on the up journeys is 8.3 carriages of the London & North-western large 6-wheel type, each weighing about 12 tons, or without engine or passengers about 100 tons. On the down trip, the average load was 11.2 carriages, or about 134 tons.

The greatest load the engine has taken was 16 carriages, equal to a total load with engine of 260 tons (English), running at North-western Railway speeds, the figures of which I regret not to have with me, but which are not much under Great Western Railway speeds, the quickest of which is the "Flying Dutchman," 76 miles in 87 minutes.

The average consumption for the month, including lighting fires, was 28.2 lbs. of coal per mile, as against the ordinary engine minimum of 30 lbs. per mile doing the same work.

This, I think, may well be considered a satisfactory result for a first month's working, for we may well assume that under such circumstances the best result attainable has not been accomplished.

MAXIMUM WEIGHT ON DRIVING WHEELS.

THE SECRETARY read a question proposed by Mr. Wilder: "What is the Maximum Limit of weight to be allowed per wheel for Locomotives?"

Mr. HOWARD FRY would try to present the views of Mr. Wilder, who was not present. He believes there is a certain

weight on the driving wheel which is occasionally reached in practice which is so detrimental to the tires of the driving wheels that the engines only have to stand still long enough and the tires will be worn out, and that it is an extremely important thing for those designing locomotives to be aware when that point is reached. I think Mr. Wilder is of opinion that that point has been reached in the practice in America, and that engines now in existence are rapidly wearing out their tires in standing still. This, of course, is a very exaggerated statement of his views, but undoubtedly there is a very important principle underlying it.

The question is, whether, when we reach the limit of elasticity in the metal, the tires, and of course the rails, do not wear very much more rapidly than when we keep just inside the limit. If I may illustrate the question in another way, there is an impression that a piece of iron may be stretched, may be strained, a very great many times, almost up to its elastic limit, without doing it serious injury; but, a very few pounds added to the strain applied to the iron will give it a permanent injury. The question is then, is there a certain weight we can place upon our tires which will permit the tires to do good service for a length of time, and is there a very slight addition of weight we can place upon our tires which will very rapidly wear them out?

Mr. WILDER, New York, Lake Erie & Western Railroad: The maximum weight allowed on the driving wheels of locomotives varies very much upon different roads. Upon our road the limit which our Chief Engineer almost insists upon our keeping is 13,000 pounds, 12,000 pounds being the preferable amount. In building our consolidation engines we have put only 11,000 pounds on a single driver, and, if we can be allowed to place as they are doing now in many instances as high as 17,000 or 18,000 pounds upon a driver, we can build engines to do the work required with a less number of wheels, and it is a point we should ascertain as soon as possible.

The PRESIDENT: I think it is not unusual at all to get from eight to nine tons per wheel in English practice. Now, if eight tons, for instance, can be carried on a wheel safely and without detriment to the wheels, tires or track, it is very important that we should know it.

Mr. WILDER: I meant to say, if I did not, that they are already building engines on different roads, notably on the Reading road and also on the Pennsylvania road, which have eight to eight and a half tons—16,000 or 17,000 pounds—upon a single driver. Some time ago (probably the members of the Association remember it) a paper was published by Mr. Chanute, Chief Engineer of the Erie road, upon the foot-prints of a locomotive, in the *Railroad Gazette*, in which he showed diagrams of the spot or point of bearing as taken by putting tissue paper with a little manifold paper under a driving wheel. It showed that the amount of bearing that the driving wheel had upon the rail did not exceed over a tenth of a square inch. That would show that the pressure upon that point, if we had 12,000 pounds on the driving wheel, would be 120,000 pounds to the square inch. Bessemer steel will take a permanent set at about 150,000 pounds, and with 12,000 pounds on the driving wheel we would then be within 30,000 pounds of the elastic limit. Of course, as the metal gave way the point of bearing would become larger until it arrived at a point at which it would sustain the load; but, at the same time it would give the rail a little permanent set (it might be very slight), but by continually increasing that weight we would soon destroy the cohesion of the molecules of the rail and they would peel off. I think you will find that on all these driving wheels, where we have got over 12,000 pounds, we have an excessive wear on them.

Mr. SEDGWICK: I have always supposed that about 12,000 pounds was the limit for a road on which the rails did not exceed seventy pounds to the yard. Experience has led me to believe that your road must be very well ballasted and very well tied, to exceed that, particularly if you are running fast trains.

Mr. DUBOIS, Rhode Island Locomotive Works: A few months ago I placed an engine on the New York & New Haven road, and it has been in constant use ever since. I examined it the other day and it showed the best results. They stated that they would not have a pound taken off it under any consideration. Those wheels have eleven tons on each pair, 88,000 pounds on the four wheels. We have been putting out passenger engines in the last year, running from fifty-eight to sixty and sixty-four thousand pounds. We have one passenger engine running now, which is running sixty-two and a half miles in one hour and fifteen minutes, making one stop. It has 62,000 pounds on the drivers, and I cannot see any perceptible wear on that more than on the others.

Mr. FRY pointed out the fact that with the increase of weight on driving wheels there has been an extraordinary decrease in the cost of transportation. The decrease in wages seems to have more than counterbalanced extra wear of tires and rails. Whatever the relations of cause and effect, it is interesting to note that these changes have come together. He gave some weights from actual practice: On the Erie 24,000 lbs. per pair of wheels; on the Pennsylvania, 32,500 lbs. per pair of wheels; on the Central of New Jersey, 31,500 lbs.; on the Reading 34,000 lbs.; on an English railroad (Great Northern) 40,320 lbs., and on the engine mentioned by Mr. Durgin 44,000 lbs. per pair of driving wheels. It would be interesting to know how fast the tires wear with these loads.

Mr. F. M. WILDER: Mr. Fry's remarks would convey the impression that the diminished cost of transportation was in some way connected with the increase of weight on the driving wheels. The maximum weight on a pair of drivers on our road (Erie) is, as Mr. Fry has stated, 26,000 pounds. I do not think that a more remarkable showing of the decrease of the cost of handling freight can be shown than by one of the tables of the annual report of the Erie road. As I remember, sixteen years ago, the amount we received per ton per mile was two and a half cents or about that; the cost of handling was one and a half cents or very near it. Last year the amount received per ton per mile was eight-tenths of one cent and the cost was about five-tenths; showing a decrease of 66 per cent in the cost in 16 years. We have not increased the weight on any single point on our driving wheels. What we have put into service is the consolidation type of engine, putting on more drivers to keep the weight per wheel down to our limit.

Mr. WOODCOCK, Central Railroad of New Jersey: Mr. Fry referred to our road as having considerable weight on our driving wheels. I will say that one of those engines has run for a little over a year. I have not noticed anything in the way of unusual wear about those engines. I think the quality of the tire has a good deal to do with the wear. I have noticed, on some of our lighter engines, that they usually have more wear than those referred to as having the excessive weight.

Mr. DURGIN: I wish to state that on a double end switch engine used on the New York & New Haven road, at the Harlem River, there is 88,000 pounds on four wheels, 64,000 pounds is the heaviest road engine we have; they vary between 58,000, 60,000 and 61,000.

The PRESIDENT: There is another large item of saving, that is the matter of fuel. I think that any one who has made the careful experiment will bear me out in the statement that a large engine burns no more, or very little more,

working to her full capacity, than a small engine working to her full capacity.

Mr. FRY: Confining ourselves more closely to the question of tires for the time, Mr. President, the large engines, as pointed out by Mr. Wilder, are not excessive in their weight on the tires; their weight can be distributed over four or five pairs of tires. I believe, in some cases, six pairs have been placed on very heavy engines. It is when heavy passenger service has to be done at a high rate of speed, that it becomes important to know how far we can go in putting weight on a pair of wheels. Very few of us would like to run our consolidation engines at a mile a minute, and, yet, it becomes necessary to haul passenger trains at that rate of speed; and, if a large passenger train has to be hauled and is divided into two, of course, the cost of hauling those passengers is double. Just as we have been consolidating our freight trains, so the tendency is now on our passenger roads to consolidate passenger trains. It is interesting to note that with the exception of the switching engine, spoken of by Mr. Durgin, the other engines that were mentioned by him as having heavy weights upon their wheels were all passenger engines. A few years ago, if we wanted to run trains at that speed, we had to run them in two or three sections where we now put them in one.

DRIVING BOXES.

The PRESIDENT: I have one question: "What is the best form and material for the construction of driving boxes?" presented by L. T. LYNE, one of our associate members.

Mr. LYNE: The difficulty I find with all the usual methods of fitting driving boxes is, that however carefully the brasses may be fitted and placed in the casting, the casting is spread open so that when the brass is bared the casting closes in. After the casting is all fitted up and the driving box is ready to be placed on the axle, it has closed in, in some cases, I have found a thirty-second of an inch. The brass when new is from an inch to an inch and a quarter in thickness, and as that wears down, the box keeps closing in. And in driving boxes from under an engine, that have run three to three and a half years, I have seen the castings come together very nearly the sixteenth of an inch. The result of all this is that when the casting closes it, it makes a bad fit in the jaws, and causes a very disagreeable pounding and is very detrimental to the working of the engine. I understand that upon some roads a composition driving box has been used, for instance on the Pennsylvania Railroad, where the driving box is made of solid composition, and is bored at first and fitted to the axle. After it has run and lost motion accumulates, the journal is slotted out and two pieces of composition are dovetailed in on either side of the crown of the box. The space between is filled with babbit metal; that is bored out and the box is riveted and planed upon the outside. Now it strikes me that this is a much better method than the ordinary style of cast-iron box. On some of the best engines I have seen in this country the flanges on these driving boxes have been broken off, so that shoulders are worn upon the flanges and shoes, and the result is that the lateral motion accumulates there to a dangerous extent in some cases.

MASTER CAR-BUILDERS' ASSOCIATION.

Reports and Discussions.

We continue this week our extended summary of the proceedings at the late convention of the Master Car-Builders' Association with the following notes of discussions:

CARRYING CAPACITY OF FREIGHT CARS.

The report of the committee on this subject (published in the *Railroad Gazette* of June 16, page 355), was taken up:

Mr. SMITH: The committee have refrained from making any particular recommendations, thinking it best for the Association to take up and discuss the subject.

Mr. DAVENPORT said that the success that has attended the carrying of 20 tons of freight in a car, so far is very gratifying, but he found trouble would come as shippers learned to overload, putting 30 tons into a 20 ton car. A great deal of timber is put into cars now that rapidly deteriorates in strength by seasoning. While it retains its appearance of strength, and while it will bear great strains, it will not bear great transverse strains. It will do very well for posts and braces, but not for longitudinal timbers. The test as given in the books is entirely erroneous as demonstrated by actual tests made by United States standards on transverse strains. Do not let us be too hasty in rushing to a 30-ton car. We have won a great triumph. Our standard axle has shown capacity to carry 20 tons, and if they slip on an extra 5 tons and make it 25 tons it will carry it nicely and coolly, but if we make a car to carry 30 tons, they will put everything they can get into it, no matter whether it is pig tin, or pig lead, or pig iron. Now the result of this would be simply disastrous, the bridges would not stand it if the cars would.

Mr. SMITH: Of course we understand with the 30-ton car that it is only when that class of freight that we now put into the ordinary cars is used, that it will have that capacity; and I will ask Mr. Davenport how many cars he has built in former times to carry 10 tons, to which all that has been done to make them carry from 15 to 20 tons has been to alter the figure on each side and they would carry the increased load safely.

Mr. C. E. GAREY: All that will be necessary to make the standard axle of to-day carry 30 tons, will be simply to increase the size of the axle between the wheels slightly to keep it from bending. The journal is quite sufficient to carry 30 tons.

Mr. TOWNSEND: From the very fact that we build cars to carry 20 tons, and they put in 25 and 30 tons, it seems to me that if we build cars to carry 30 tons, they will be carrying 40 tons. It seems to me that there must be a limit to this carrying capacity sometimes. It is a question in my mind whether our road-beds and bridges are prepared for this. If we could load our cars say 25 tons, and no more, I would be in favor of 25 tons; but from the fact that they would put in 30 tons, I think we should stop at 20.

Mr. BISSELL: It seems to me that the liability to accidents to trains by putting in such enormous loads, must be greater than by putting in moderate loads—the liability to heat boxes, etc. One feature brought out by Mr. Davenport's remarks, seems to me to be worthy of very grave consideration, and that is making such a great weight to go over our trestle work.

Mr. SMITH: My view of this matter is directly opposite to that entertained by Mr. Biswell. The more car capacity you have, the less wheels you have, the less draw-bars, the less coupling, and the shorter the trains. The advantage is all on the side of greater safety in every way. I believe with Mr. Garey that with a heavy car, that with a 30-ton car, the middle of our axles should be increased in size to keep it from springing. There is no danger of a car breaking down, even a wooden car if it is fairly and well built. The lumber would not break, there is nothing there that would give out, and the iron car can now be built that will carry from 30 to 40 tons, and our railroad companies are building their bridges stronger in every way, and their road-beds are made better in every way.

Mr. RAYMOND: If the carrying of this larger tonnage in freight cars is a matter of economy and safety, I do not

apprehend that the strength of bridges, or trestle work, will stand in the way of it; if there is economy and safety in so doing, let us rebuild the bridges.

Mr. RAYMOND wished to turn the discussion a little. There is a question as to the bearing of the journal. There are certain railroad companies who have not seen a hot box since they have had the Master Car-Builders' Journal, and yet I will guarantee to go on their roads and find a hot-box within forty-eight hours. I don't hesitate further to say, if you take the dust guard and the box lid, and the bearing, and the journal, and all those elements put together, and a more shapeless and unmechanical arrangement is not in use to-day in the United States in any blacksmith shop. Everything depends on weight. The question is as to how much you can put on that journal, and how you can put it there without disorganizing the thing. Mr. Davenport can build a car that can carry 50 tons if he wants to, but the key-note to this expression as I saw it is in the box.

Mr. LEANDER GAREY thought that the increase in the speed at which freight trains are run should be considered. To-day they are run, nominally, at 12 to 12½ miles per hour. Within the next five years they will be run at 25 to 30. The small journal which answers at the low speed will not carry the same load at the higher speed. He thought it best to leave the questions of axles and car-loads to settle themselves, together with the question of train speeds. He also said a freight agent ought to know enough to load a car according to the capacity stenciled upon the side of the car; if they do not, there ought to be some means of informing them that they should obey orders, and that a car should be loaded according to the capacity stenciled upon it. We are having at the present time a great many broken axles and hot boxes on the small journals where the cars are loaded with 15 tons. The small journal is not economical to load 15 tons upon and run even at 15 miles an hour so far as the journal goes. The standard journal can carry 20 tons with a speed of 30 miles an hour; but when it is loaded beyond that, I am inclined to think that unless the road-beds are in better condition than most of them are, that you will find the axle will spring very materially, causing bad wear of both track and wheels, and very liable to cause more or less expense.

LIMIT OF SAFETY IN RUNNING A HOT JOURNAL.

The PRESIDENT suggested for discussion the question: "Is it safe to run a journal under passenger trains after it has been heated sufficiently to burn out the packing and cooled off with water?"

Mr. BISSELL: It is usually the case that new cars running out of the shop will run warm if ever. Sometimes it will be so warm as to discolor the paint on the box and spoil it. I think it is very seldom the case that they take those journals out that heat up.

The PRESIDENT: Car-builders, as a rule, pack their boxes very shabbily, and they almost always get hot; but they are very seldom allowed to get hot enough to burn the packing out and to be cooled off with water. I have taken great interest in trying to learn what was the cause of journals breaking off at the shoulder, showing no fracture while the center of the axle would show a remarkably good quality of iron. A few days since I was testing some axles, and during the test I put under a few old axles, and at the second blow on one of them the journal flew off into the air, I should say 10 or 15 ft., simply with the jar of weight dropping upon the axle. The axle was tested with a 1,600-lb. drop, and, in order to find out the quality of iron in the axle, I concluded to break it, and if my memory serves me, I would drop that 1,600-lb. weight 15 ft., reversing the axle each time seven times before we broke the axle. Now, the journal showed no fracture of any description. It was completely crystallized, and I am very strongly of opinion that that was caused by meeting, in the first place, a cooling off with water under load, and I am so thoroughly satisfied on that point that my instructions are to remove every axle that has been heated sufficiently hot to be cooled off with water. I have seen several instances where the journal dropped off and was found in the box and the car came in safely. In fact one or two of the Pullman cars have come in with the journal lying in the oil box. While I don't doubt that the axles were of good material I firmly believe that an axle, after it has been heated sufficiently hot to burn the packing out and cooled off under load, is an unsafe axle; and by microscopic examination of the journals that drop off in that way, you will observe that there is a yoke very often the whole distance around the axle at the shoulder, showing that under load the journal bent as it revolved.

The British Parliamentary Committee on Railway Rates and Fares.

The Select Committee on Railway Rates and Fares met last week to consider its report, Mr. E. Ashley in the chair. Two reports were presented, one drafted by the Chairman, and the other by Mr. Barclay, the member for Forfarshire. After considerable discussion, Mr. Barclay's report was read a second time by a majority of 12 to 10, and it will, therefore, be adopted as the basis of the deliberations of the Committee. The Committee will meet on the 30th of June to discuss the paragraphs of the report in detail. The draft report prepared by the Chairman first deals with the allegation that the railway companies have charged higher rates than they were authorized to do. In some cases in the southern lines this charge had been substantiated, but in regard to the majority of cases where the charges are made, the question of terminals arises. The terminal charges include charges for stations and sidings which may be called station terminals, and next charges for loading and unloading, collecting and delivering traffic, which may be called handling terminals. The report expresses the opinion that the companies are entitled to terminals for both charges, and recommends that the right of the companies to charge for station terminals and handling terminals should be recognized by a declaratory act, and that the sums to be charged should be entered on the rate-book and publicly notified. The report next deals with the classification of goods. It recommends that the companies should be compelled by law to adopt the revised classification as between themselves and the public that is already in existence between the companies themselves. It next deals with the subject of preferential or exceptional charges, examples of which are that the companies carry goods cheaper from Barrow and Fleetwood, where they have docks, than from Liverpool, and that the North-eastern Company exacts higher charges from Hull than from Tyne or Hartlepool. It is pointed out, however, that the consumers get the benefit of this competition, and that under it the sugar-refiners of Greenock are able to be in the same markets as the sugar-refiners of London. The report confirms the opinion of the Committee of 1873 with regard to the impossibility of adopting equal mileage rates, and states that inequalities of charges are rather to the benefit than to the disadvantage of the public. It is pointed out that where an undue preference is given the law now gives a remedy. The witnesses from Ireland complained of the expensive management of the Irish railways, and the report expresses the opinion that the further amalgamation of the Irish railways would tend to economy and efficiency of working. It suggests, however, that the companies

should be prohibited from charging more for conveyance from one station to any other station than from that station to the terminus. It proposes that in order to give the public protection against the capricious acts of railway companies, Chambers of Commerce and Chambers of Agriculture should have a *locus standi* before the Railway Commission. It advises that a right of appeal should be given from the decision of the Railway Commissioners, and that the jurisdiction of the Commission should be extended, so that they should have powers to enforce the provisions of special and general acts relating to railways, to give redress for illegal charges, and to impose damages for injury sustained. It proposes that the powers exercised by the Board of Trade as to traffic agreements should be transferred to the Railway Commission, and that it should have conferred upon it all the powers and incidents of a court of record. With regard to canals, serious and numerous complaints have been brought before the committee, and the report recommends that the Commission should be empowered to grant through rates on canals, notwithstanding any arrangements to the contrary, and the abolition of charges which are used with a view to impeding or diverting traffic. On the whole, the report acquits the companies of any serious offence, and its proposals are, shortly, that the terminals should be published by the companies and sanctioned by the Railway Commission; that a uniform classification should be adopted by the railway companies; that the fares should be stated on passengers' tickets; that a *locus standi* should be given to Chambers of Commerce and Agriculture before the Railway Commission; and that a *locus standi* should be given before parliamentary committees on railway bills to persons complaining of the rates and fares of companies applying for further powers.

The draft report submitted by Mr. Barclay contains a somewhat different view of the conduct of the railway companies, and proposals of a wider character. The report first discusses the complaints made against the railway companies in regard to goods traffic. On the subject of illegal charges, it points out that the allegation of the railway companies is that, including charges for terminals, the rates are not beyond their powers. It is not disputed that they are entitled to charge a reasonable sum for loading and unloading, but the charges in dispute are those for stations, sidings, platforms, warehouses, cranes and the repair of station buildings. If they are not entitled to make these terminal charges they are undoubtedly exacting rates in excess of their legal maximum. The report then refers to the subject of preferential and excessive rates. It points out that hops are conveyed from London to Boulogne for 17s. 6d., while the charge from Ashford to London on the same railway is 35s. The beef of American cattle slaughtered at Glasgow is sent to London for 45s., while for the meat of home cattle the charge is 77s. It states that there was an increase of rates following the rise in the price of materials in 1870; but that, though the cost of materials has since fallen, the rates have not been reduced. The rate for the conveyance of the fish from the northeast of Scotland 30 years ago was 35s.; it is now 140s.; and witnesses from Forfarshire and Cornwall complained that the rates absorb a large portion of the price. It is not necessary to adopt any rule for fixing rates; but as prices in the open market are ultimately determined by the cost of production, that principle should, as far as possible, be applied to railway rates. After noticing the necessity of an improved classification for goods, the report refers to the system of preferential rates, which it says is a policy of protection. The existing law contains adequate provision for the redress of well-founded complaints of overcharging or undue preference; but, owing to the enormous resources of the railway companies as compared with individual traders and farmers, it is practically impossible to obtain redress. Even if successful in litigation they sustain pecuniary loss, and they prefer to suffer loss and inconvenience rather than apply to the courts for redress. The report, therefore, recommends that a small department in the Board of Trade should be created for the special purpose of taking cognizance of the complaint by the public against the railway companies for the violation either of their special acts or of the public statutes. It would be the duty of this department to investigate complaints where well founded, to require redress, and, if necessary, to take the railway companies before the Commission. It also proposes that Chambers of Commerce and Agriculture, and other associations of traders, should have a *locus standi* before the Railway Commission. The report states that no serious difficulty stands in the way of the uniform classification of traffic for all railways in the United Kingdom, and that such a classification would be of great advantage, not only to the public, but to railway companies. With regard to canals, it recommends that Parliament should not further sanction the control by railway companies of canal navigation, and that the Railway Commission should have power to fix and enforce through rates on canals on the shortest route principle. With regard to the jurisdiction of the Railway Commission, it has been suggested that there should be an appeal on matters of fact as well as of law to the Court of Appeal. It is pointed out that the Commission has jurisdiction over Ireland and Scotland, as well as England, and that it would be unfair to bring suitors from the former countries before an English Court of Appeal. The report suggests that one appeal should be allowed on questions of law, and that, as the Railway Commission is an international tribunal, the appeal should be to the House of Lords, who should decide what were questions of fact and what of law. The powers of the Railway Commission should be extended so as to enable them to enforce the provisions of the special acts of the several companies, to give redress for illegal charges, and to deal with passengers as well as goods traffic. The Press Association states that considerable alterations may yet be made in the draft report of Mr. Barclay. Although this draft does not, like that of the Chairman, include any proposal for the amalgamation of the Irish railways, it is believed that an amendment to that effect will be proposed with considerable prospects of success.—*Capital and Labor*.

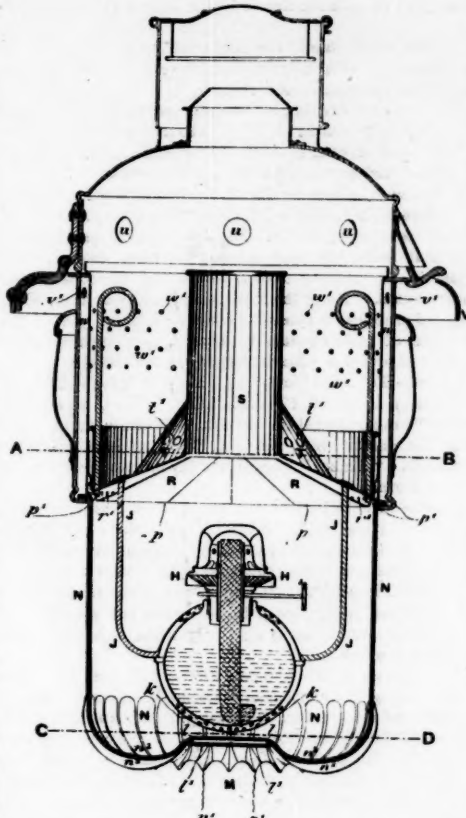
An English Railway Carriage Lamp.

One of the first things which strikes an American in an English railway station is the different character and construction of the lamps used in their "carriages" or passenger cars. These, as has been explained before in these columns, are put into and taken from the vehicle through openings in the roof by a man on top, to whom the lamps are handed by another man on the platform below. The opening in the roof has a hinged cover which closes it after the lamp is put in or removed from its position. It looks rather comical to a Yankee, to see a man pass along the top of a train of cars, raise these covers, insert a tin tube and blow out each lamp which is to be extinguished but not removed from the carriage. When they are to be trimmed and filled they are lifted out of their receptacle and loaded on a truck provided for the purpose, which is wheeled alongside of a train to collect or distribute them.

The lamps appear to be duplicates of each other, so that any one will go into any car or receptacle for it.

The finish of these lamps is very plain and neat, and there is an entire absence of what might be described as the

FIG. 1.



AN ENGLISH "RAILWAY CARRIAGE" LAMP.

jingling ginger-bread-like style of decoration, which still appears to meet with favor among car-builders here.

Engravings of an English lamp may therefore interest some of our readers. Those we give are copied from the

FIG. 2.

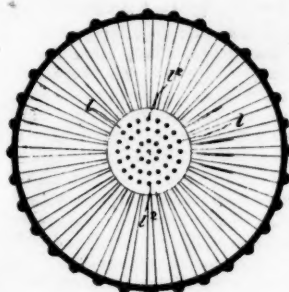


FIG. 3.

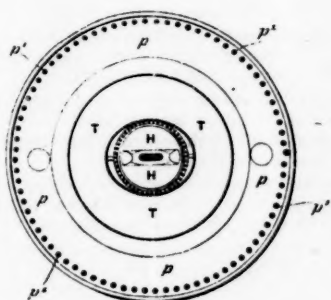
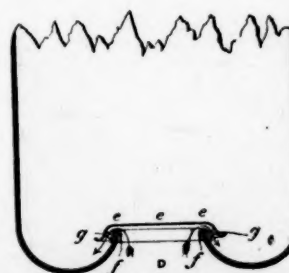


FIG. 4.



specifications of a patent granted recently to Mr. Bulpitt, of the firm of Bulpitt & Sons, of Birmingham, lamp manufacturers.

As will be seen, fig. 1 is a vertical section and figs. 2 and 3 horizontal sections on A B and C D, respectively.

The roof of the car, however, is not shown, but the top of

it would come about on a line with the letters V V. The upper portion u u u forms the cover, the hinge of which is shown on the left side of the engraving just above v'. The outer case between the letters A B is fixed to the roof of the car. H H is the burner with the receptacle for oil below. N N is an inverted glass globe or more accurately cylinder, which is attached to the inner case w' w' above. R R is a reflector and S a chimney, all attached together and to the globe or "protecting glass," as the patentee calls it. The lamp proper is suspended from the reflector R R by rods J J. The glass protector is supported in the fixed case A B on a flange at p' p', and w' w' has a similar flange at its top. The case w' w', protector N N and lamp can all be lifted out of the opening in the roof of the car, when the cover u u u is removed. It will be noticed, too, that the latter has a small door on top, which is opened to receive the tube with which the lamps are blown out.

The inventor describes his invention as follows:

"The first part of my invention has reference to the guard glass used to protect the roof lamps of railway carriages and lamps used in similar positions, and consists in the peculiar shape of the lower part, which is pierced with a ventilating hole (M) or holes for the purpose of supplying air to the lamp and to lessen the downward currents of air when subjected to high winds externally. The bottom part of the glass is bulged upwards internally which serves as a bell mouthed guide for the air and as a protection against any oil running down into the carriage which may accumulate inside the lamp from overflow. I prefer to form the glass with a considerable hole having its edges turned upwards. This hole I cover both externally and internally with a metallic perforated plate, the perforations of the under plate not being opposite to the perforations of the upper plate, which prevents anyone tampering with the lamp from the inside of the carriages; or a cover guard may be placed over the hole with its edges turning downwards, as shown in fig. 4, which answers the same purpose. The underside of these glasses may be bulged downwards with several bulges, or put so that when the lamps are standing on the floor there will be an admittance of a certain amount of air to keep the lamp burning properly.

"The second part of my invention relates to the upper part of the lamp casing or that part actually above the body and the burner of the lamp, and yet forming a part of the complete lamp.

"My lamp is suspended under the reflector R R by two light rods J J, which are fastened into a plate at the back of the said reflector, this back plate rises in a conical shape against the chimney, which projects downwards some distance, and the conical back plate is perforated with air holes; I also form a chamber w' w' around the inside of the case which receives air externally under the projecting top lip of the said casing, the inner casing being liberally perforated all around, so that by these means the lamps is kept very cool and all danger avoided of firing the roofs."

The inventor claims that, with this lamp, light oils such as petroleum may be burned, because of the protection from heavy winds which the arrangement affords.

The idea of inserting lamps into cars from the outside, through suitable openings, is commended to inventors in this country as a possible means of guarding against fire in case of accident. Certainly a lamp which would fall out in case a car turned over, as they sometimes do, would be less dangerous than one which would be rolled around inside of the car.

Contributions.

A Road-Master's Impression of the Lake Shore Road from Lansing to Chicago.

TO THE EDITOR OF THE RAILROAD GAZETTE:

There are times when a person can travel on a railroad and enjoy it; at other times and places there is nothing agreeable about it. On the contrary, on some roads everything is disgusting and gloomy. The cars are dirty, the trainmen uncivil, snappish and snarly, and one feels relieved when his journey is ended. But it is a relief after one has been pounded for a season on a rough track and endured the foul odor of a filthy car and been snubbed by uncivil trainmen to change cars and get on a road that is managed by white men. Here a glance makes it apparent that there is a vast difference in the way railroads are managed in this country. In looking about Lansing, the first thing that attracts the attention of the traveler is the cleanliness of the grounds and station buildings, and the civility of the employees of the Lake Shore road. There is an air of tidiness and cleanliness about the premises that is truly refreshing. The stairways leading to their offices in the upper portion of their neat stone passenger house are kept scrupulously clean, as are all the floors in the building. The platforms on the outer sides of the building and the tracks in the yard look every day as though they had been brushed up for a picnic or some extra occasion. When looking about the premises one will not fail to notice the guards for overhead bridges. Near the station in Lansing the Lake Shore road passes under a street bridge, which is rather low for tall brakemen, who are standing on top of the cars. This guard is similar to that in use on some other roads and consists of a small beam running crosswise the tracks and supported by posts at a height of several feet above the highest smokestack. To this beam (about 4 x 6 in. in section) are suspended ropes 5 or 6 ft. in length. These ropes are pendent from the beam and are about 6 in. apart. The ends are about two ft. lower than the bridge, and a gentle rap from the end of these pendent ropes reminds the person whose head is too high for safety that he had better sit down a few minutes. Another feature worthy of notice is the safety switches, that are kept in fine order here. One might say that to mention the fact that these safety appliances are in use on this road is out of place, because they are in use on many other roads. This is true, but there are a great many more roads that do not use them, and such as do adopt measures of safety are worthy of public mention. There is another thing that may be seen in the Lansing yards: The ends of guard rails and

the "boot-jack" openings of frogs are filled with pieces of plank to prevent people being caught in these traps and run down and horribly mangled. This does not afford a thorough protection, but it will save many lives.

The Chicago papers alone report 128 horrible deaths from persons being caught in these traps within one year. This is, of course, only a small portion of the whole number killed in the whole country. The great difficulty in providing a satisfactory remedy for this trouble is that it is not safe to fill up these spaces with any rigid substance, for obvious reasons. A flat steel spring bent to fill the space and spiked to a tie has given satisfaction on some roads that are giving it a trial. The spring yields to the pressure of wheel flanges and keeps feet out of the trap. This is a matter worthy the attention of every railroad officer in the land.

On leaving Lansing there is no rattling of loose frogs and switch-roads and lurching or dodging of coaches such as is usual in passing out of yards. When fairly under way, the traveler at once feels himself at home, and when John Ross comes along and collects your fare and deftly shoves a check in your hat-band, you feel as though you could ask a few pertinent questions and receive a pleasant answer to all of them. Pretty soon Mr. Ross announces in a clear voice that "the next stop is Packard." You understand what he says, but before the train stops he goes through the train and calls the name of the station at least twice in every coach. Then two brakemen also call the name of the station distinctly, so that any one must either be deaf or an idiot to not know where he is. In addition to this the conductor's check has the name of every station on the division. Also, the distances north and south from Lansing, and the distances from West Elkhart (the junction with the main line) to Chicago, East Toledo, Cleveland, Erie, Dunkirk and Buffalo. This little blue card, a little more than an inch in width and $\frac{3}{4}$ in. in length, contains a great deal of valuable information, and answers a great many questions, thus relieving the conductor of the trouble of answering a thousand questions. This is far preferable to the too prevalent custom of using blank checks that give no information and afford no comfort to the traveler other than the satisfaction of knowing that if he does not lose it he has a receipt for his fare.

One thing that attracts the attention of travelers on this line is the snug piles of old ties, shims, bark chips and other rubbish that have been raked into tidy heaps to be burned when a favorable opportunity occurs. This will be when the rubbish is dry and wind and weather favorable. These fires will be attended to until all the trash is consumed and the last spark extinguished. Other roads might do likewise to their great advantage. The right of way on the Lansing Division of this road receives as much care as the average lawn and is a marvel of railroad neatness. The fences are not of the barbarous wire, but good substantial post and board, and in good repair. The ditches and water-courses are scrupulously clean and well sloped. These things are not mentioned here as being the only instances of the kind in the world, but because there are far too few roads that observe the rules in force here, and it would be better for both the railroad community and the public if other roads would take this road as their model.

It may be that the reason of the Lansing Division being so well kept in all respects is that the Superintendent, Mr. W. H. Canniff, was formerly a road-master. He had a habit of attending to track, ditches, fences and station grounds, and his promotion has not spoiled him. Road-masters make better superintendents than the sons of bankers and heavy stockholders.

The main line of this road from Chicago to Buffalo has many of the features of the Lansing Division, but a regard for truth compels me to say that many of the coaches are shockingly smutty. This may be partly due to the enormous passenger traffic, but it does seem as though the upholstery might be renovated. The same gentlemanly treatment is observable from the officials on the main line as elsewhere, and in all things the Lake Shore is a model road.

WM. S. HUNTINGTON.

Papers on Painting.—No. 13.

BY CHARLES L. CONDIT.

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THE PURCHASE AND MANUFACTURE OF VARNISH.

As a rule, with few exceptions, varnishes will be purchased; information as to manufacture may, therefore, be limited to a purchaser's needs, and to some notes on the simpler varnishes.

There is more difficulty than mystery about the manufacture of varnish, and this difficulty arises from lack of means of testing the materials used, the heat of the fire, etc.

Varnish is made of oil, turpentine and resins. The quality and manipulation of each of these materials determine the quality of the varnish.

Varnish-makers are perhaps inclined to feel that other people know very little about varnish, and other people are perhaps quite as likely to get their heads full of notions as of hard facts about varnish. On the other hand, varnish-makers know much less than they should. The whole subject is in that "practical" stage of knowledge where a notion is in danger of getting more valued by everybody than is a scientific fact.

The facts seem to be: 1. The hardness and part of the durability of the varnish depend upon the resin. The more oxygen the resin already contains, the less it is affected by the air; and for this and other reasons, the less by water. The air oxidizes the resin as it does the oil, but hard resin

protects the oil from the air. Water separates the fine particles of resin from the oil.

2. The oil gives the varnish its elasticity; if it has been made into soap or contains much drier, the elasticity of the oil is destroyed. Better for durability, a poorer resin and more good varnish oil, than a better resin and poor or little oil.

On the other hand, the more oil in the varnish, the more skill needed in using it coat over coat. Also the more skill needed in making it a varnish.

In selecting a varnish, as we shall see, three facts cannot be left out of account: 1. Who is to use it? 2. What is to be put under or over it, now and by and by? 3. When will it be used, and how much time will it have to dry?

The Resins.—There are in all about thirty different resins used in varnish-making—different in name, and many possessing peculiar qualities. The best of these resins are fossils, that is to say, they are dug out of the ground, or are found in the beds of rivers, where they have lain for unknown years. All of the fossil resins are from trees, which may for practical purposes be called species of pines. The hardness of resin appears to depend upon its age and the amount of pressure it has undergone in the earth.

Amber.—This, the hardest of all resins, is found in layers or mines on the coast of Prussia. Only refuse, or so-called "black" amber is used for varnish. The trees from which came the amber grew, perhaps, when no men existed on this earth. "Amber" varnish usually means merely amber-colored varnish.

Copal.—Next in hardness to amber is the best copal from Zanzibar (Africa), called by the English anime. It is very difficult to dissolve, and practically there is but one method in use—namely, distilling the resin until it loses from 20 to 25 per cent. in weight. It may then be dissolved in boiling oil. Zanzibar copals are of three sorts in many grades; the better sorts give most lasting varnishes, but with more tendency to crack.

Sierra Leone Copal is much used in English varnishes. It has nothing to do with Sierra Leone, but comes from the river beds of the interior. It is the only African copal which is dissolved in cold alcohol. Its color is not nearly so good as Zanzibar, or the best Kauri copal, but it is harder than the latter. In English varnishes it is mixed with Zanzibar (or "anime"), the Sierra Leone giving elasticity, the anime, hardness.

There are also of African copals, *pebble, ball or glass, Accra, Loango, Gaboon, Congo*, and the three sorts of *Angola* and one of *Benguela*.

The pebble, ball, best Loango, red Angola and the Benguela are much esteemed—the white Angola being the softest—its softer kind sticking to the teeth when chewed. The pebble (or pebblestone) is the hardest of these copals.

The Kauri or Cowrie, of New Zealand, is, however, the principal copal used in America—its consumption being probably ten times greater than the combined quantities of those already mentioned. It is from two to nine times cheaper in price, is more colorless, very easily dissolved, and gives therefore a clearer varnish than any other resin. It is allied in chemical composition to the dammar resin; it melts more easily than mastic, but less easily than resin.

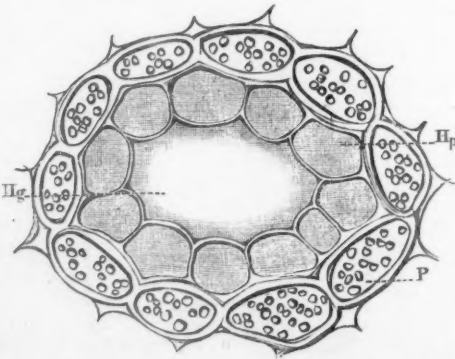
Its great defect is its quick loss of lustre—the loss of the prime requisite of a varnish. A varnish made from the best selected pieces of Kauri gum holds its lustre second to a mixed Sierra Leone and Zanzibar copal varnish, but lower qualities go quickly. The loss of lustre does not cause loss of protecting power—the substance of the varnish remains.

Anime.—This was the original name given to copal, from the fact that it contained insects embedded in the gum. It is now the technical name for South American copal. This copal is from Brazil, and is not found in our market.

Manilla.—There are two sorts (neither fossils), a harder and a softer, from the Philippine and other islands, Borneo, Singapore, etc. They find a large market here, and are used in varnishes, alone and with harder resins.

Resin is too well-known to need many words. By it, however, we may illustrate the making of resin in the tree. All resins are dissolved in their natural turpentine; they are entirely different from mucilage.

Mucilage is a cell (see cut) well dissolved by water—the mucilage of the linseed, for example, which soaks up the saliva from the mouth, swells up and changes into a sweet slime. A resin is a secretion or perhaps a waste-stuff (excretion) of a tree or plant.



Section through a resin passage of *Abies excelsa* (fir and spruce trees). The cavity *Hg*, as well as the thin-walled cells *H p*, are filled with semi-fluid resin. The thick wall cells *P* contain starch.

The resin which we now use for varnishes flowed out ages ago in a fluid state, often catching and holding the feet and

then the bodies of insects lighting upon it. By various causes, gradual or sudden, it found its way underground. There it was pressed upon by the earth. To the action of the oxygen of the air and the pressure of the earth, its hardness is due. The harder resins contain least water; dammar, which is a recent resin, the most water.

The following are the average prices and the order of quantities of the different resins, as used in American varnishes:

Order by quantity.	Prices per lb.
1. Kauri.....	10 to 15 cts.
2. Manilla.....	10 to 15 "
3. Dammar.....	16 to 20 "
4. Zanzibar, best.....	\$1.25
5. Benguela.....	85 "

English Varnishes.—The great market of the world for resins, as well as for money, is London. English varnish-makers have, therefore, the first opportunity, and English varnishes have always been the best in the world, i. e., the best varnishes (as we used to say in the old anti-slavery days) *per se*.

American Varnishes.—The poorer sorts contain rosin and many other things; the quality of the better sort we have discussed below.

Qualities of Varnish.—The following may be given as the qualities of a good varnish:

1. It dries within 30 hours so as no longer to be affected by dust, and presents after three days a brilliant, firm surface with no spots of dull or fatty aspect.

2. It retains for at least 12 or 18 months a clear, elastic and transparent surface.

Color is not important, unless it refuses to bleach to colorlessness in a thin unstopped vial exposed to sunlight for three to five days.

The durability of varnish must be tested by trial. Prime a smooth board with white lead and oil, let it dry, then give one coat of varnish or one coat of several kinds of varnish in squares. Expose to the weather, and make observations from time to time during one year. Don't trust yourself to make this test unless you are an honest man, and do not use "samples" of varnish for this purpose. Samples sometimes are less durable than a regular article drawn from a barrel, sometimes they have more durability. It is not advisable, therefore, to trust samples. It is also much better to prepare three boards than one, as slight differences are due to position; for example, either end of an upright board will give a severer test than the centre.

Such a test, honestly made, is fair, and, if duplicated and repeated, quite satisfactory.

The question arises, however, what is to be the standard of judgment. A *kauri* gum loses its lustre much sooner than a true copal gum, although the best grade of *kauri* follows well after copal. The loss in lustre is not, however, loss in protecting power either from water or dust. It is, however, loss of the principal quality for which varnish is used. It also may show the gum to have lost its power of clearing itself of water from its surface, and is certainly on the first step in decay.

Cracking should be observed. The more oil a varnish contains the larger the cracks. Fine cracks are of little account, because they do not prevent repainting or revarnishing. Large cracks, however, are a serious matter.

It follows that the most elastic varnishes, and those containing the most durable gum, have the disadvantage of producing, when they crack, the largest and longest parings of surface. This is the case with English varnish. No varnish is so durable. It is elastic, and retains its lustre for a long time—longer than any American varnish.

In winter it dries to a fine, hard, very brilliant and durable surface, but in the warmer months, it dries with a "tach," on which one might gild. English varnish is therefore not fitted for summer use.

Again, one must know what one puts over English varnish. It will do with its own, but if even two, or two and a half years after a coat of English varnish has been used, an American varnish be put over it, there is a large percentage of danger that both will crack in large cracks, running in several directions, but with a tendency to change to a direction at right angles with the grain of the wood. Whoever varnishes or repaints a car or carriage on which English varnish has been used should know that fact, and it would be advisable in buying a car or carriage to get the information at the time. An English varnish needs a strong and not too quick varnish over it, and is more dangerous as a basis for repainting than American varnish.

Varnish-makers think and speak most of *perishing*; but this is not the worst of evils of varnish, because it is so easily cured by a second coat. A varnish should, however, hold its lustre for ten to twelve months.

On the whole, therefore, while American varnishes "perish" more quickly, more quickly lose their lustre, have less oil, are less elastic and less durable, they are to be preferred for general use.

They crack in fine checks, neither large nor deep; they are safer as a basis for repainting, and less dangerous to revarnish.

Manufacture of Simpler Varnishes.—It is well to know how to make the simpler varnishes, although of these the ether and some of the alcohol varnishes it is better to purchase.

Dammar resin is from the East Indies, although the *kauri* is a dammar and used for similar purposes. It comes to our market in larger or smaller pieces, colorless, but softer, and, containing more water than other resins, remains long sticky. Its solution is (to a large extent) possible in cold turpentine; but the varnish produced is never clear, but remains cloudy.

Heat 1 part dammar resin, 4 parts turpentine oil, until

* It is doubtful which of these should come first.

all the resin is dissolved and no more pale vapor issues from the mass, but the turpentine remains undisturbed by bubbles. Filter through linen while hot.

It is always more or less dangerous work for a raw hand to work over a fire with such materials as turpentine and "gums." It is well to have ready an iron plate and some sand to put out any extra blaze coming from the overflow of the contents of the kettle into the fire.

The dammar varnish adds lustre to zinc white, but greatly increases its tendency to crack, especially when other coats are placed over it.

The varnish may be made in the same manner for pictures. It is well, however, previously to wash the pieces thoroughly, once or twice, leaving them a little time immersed in cold turpentine.

Mastic (*Pistachia lentiscus*), from the Grecian Archipelago, dissolves in hot alcohol and hot turpentine.

Shellac melts at 212°, and is dissolved in hot alcohol. Bleached shellac is made by bleaching its soda-solution with chlorine, or sulphurous acid. The alcohol solution may be bleached by filtering through animal charcoal. It may be dissolved in double its weight of alcohol.

One hundred parts of water, 12 parts of shellac, and 4 parts of borax melted in a copper vessel at a gentle heat, continually stirring the mass, give a very simple varnish. Altogether, there is less economy in making any kind of varnish than in spending the same time in testing and purchasing the best the market affords.

COLOR AND HEAT—POSTSCRIPT.

Different departments of life have amazingly odd relations to one another. Last week's *Railroad Gazette* was still on the press, when the writer of these articles made the curious discovery of a long series of experiments on the relation of color to heat. These experiments, strange to say, had to do with the color of soil, and were made recently by one of the foremost agricultural chemists of Germany for the purpose of determining the value of the colors of the soil to vegetation. The results may be summed up as follows:

1. There is a difference of some importance to vegetation due to the color of the soil.
2. The maximum temperature, and the daily temperature variation of a dark-colored soil are greater than of a light-colored soil.
3. The amount of water evaporated from a dark-colored soil is greater than from a soil of light color.
4. But as a dark-colored soil often contains more water than a soil of lighter color, it may, by the loss of heat becoming latent in evaporation, accumulate no more, or even less heat.
5. The effect of color as to temperature of soil is in proportion to the force of the sun's rays, and to the cloudlessness of the sky. In winter, the difference (as to temperature) between the dark and light-colored soils disappears, more or less completely.
6. A dark-colored soil, which is equally dry, is hotter to a greater proportionate depth.

It would be interesting to enter into particulars; but the above is sufficient to show the curious relations of painting to agriculture. Whether the painter will ever be called upon to paint soil, we shall not venture to give an opinion—no one can predict what will happen to anything which has to do with the bottom industries of life.

A Scientific Dead Beat.

"No, I don't care about telling the world the best way of traveling without money. I don't belong to any railroaders' unions, and I don't travel on a card, like some people do. I know a great many railroaders can get carried wherever they want to go, provided they can show up a pass or a card. I never ask for passes, and that's why I never get left. Stowaways in freight cars, fellows that get under cars and ride on trucks, and men who jump freight trains and ride on bumpers, or lie flat on the top of house-cars, are not scientific free travelers. They take too many chances, and they get left. Nine cases out of ten they're looked upon as tramping thieves or bums. Of course, there's an old story about any port in a storm, and sometimes a man in a hurry has got to travel that way; but the occasions are rare where a smooth article of a talker can't get in his work, and draw a chrome in the shape of a soft side of a board floor of the caboose on the hind-end of the train. Conductors on through express trains are generally good men, especially out West. Why, sir, many a time I've gone square up to one of them before the train started, and spoke right out in a manly way, about in this fashion: 'Boss, I'm dead broke—not a penny in the world, and I'm hungry. Can't you carry me a few hundred miles? I want to get home.' Well, sir, those up-and-up fat and jolly fellows always had a kind word, but I won't give 'em away. I won't say what they told me to do and how to do it; but nine cases out of ten I got to where I wanted to go, as free as the best Congressman in the world. Oh, yes, I've traveled on a palace car in the day-time, but not at night. A free traveler don't take to sleeping coaches. I just got on to a palace car a few times just to say that I'd been there and had taken all of it in. I've made trips on engines, tenders, palace and passenger cars, coaches, freight cars, oil tanks, gondolas, wheat cars, cattle trains, coal cars, flat cars and every other kind of cars, but believe me or not, I most enjoy a pipe with a good man on the hind end of a freight train on a pleasant summer night. I tell you, sir, it beats all high-toned travel. The yarns that can be spun and the experience meetings of railroaders and tramps would make an interesting book. I can talk railroading to the best of 'em. They don't know but I'm one myself; and they don't know how soon they'll take a free trip themselves.

"Living on the road is the hardest thing about it. If a man is dead broke he finds it pretty tough. If he wants to make time, however, in a race, he mustn't look for his three square meals a day. I made a 1,500-mile trip once in a very short time; only laid off one half-hour. I was going through on a passenger train, and when I had got over about 500 miles I saw an old woman get out of the car with a heavy valise. I asked her to allow me to carry it for her to her home. She said I might. Going along I told her my story. She gave me 50 cents, and tied up enough bread and cold ham to last me three days. I hurried back to the depot, got on the same train, and went on happy as a clam. I bought

a 25-cent cigar and gave it to the conductor. He'll never forget me as long as he lives, or that cigar. It was probably the best one he ever smoked in his life. He finished it in the baggage car, and at the end of the section he passed me over to another conductor, a friend of his, who chalked my hat as far as he went. One time I caught a little boy just as he fell between the bumpers while the train was going 40 miles an hour. His father saw me raise up the kid safe and sound. That was on the Louisville & Nashville road. I got a new \$20 bill for that job, and you can bet your very life that me and all the brakemen along the line clear to Mobile and New Orleans had a picnic in a quiet way that we'll never forget. Why, sir, we had fruit, sandwiches, cold chicken, pie, lemonade, porter in bottles, sardines, cigars, hot coffee, and the best tobacco to be had for money. It wouldn't be a hard matter for me to make a flying trip over that route, would it? It wouldn't cost me a cent, would it? Certainly not; them men's white, and they've got good memories, every one of 'em.

"A man who ain't clean looking can never get ahead very good. Water is plenty and soap is cheap. Any man who wants to take a decent wash can always find a wash-room at a depot if he's smart. Do you know there's not a question that I know of that goes so deep as when you ask a stranger to help you get a place where you can wash yourself? Why, sir, no man will refuse, if he's got a heart as small as a lemon seed. That question's made me more friends than any other I ever asked. It shows up the gentleman, you know, and that's what wins every time. Nothing like being gentle, quiet and shy. If you're loud-mouthed and bullying, you'll put your foot in it every time, and it'll stick there, too. That question not only brings plenty of soap and water and a towel, but it brings something to eat and a place to sleep. One time it brought me a whole suit and a boiled shirt. But I never asked for anything more than a place to take a wash. The first time I ever got on to that racket I asked a square-looking man in Tennessee to show me to a stream of water where I could get a wash. Mind you, it was winter, and he knew I didn't want to swim. He eyed me a minute or two, and said if I didn't get out he'd break my neck. Said he: 'See here, young fellow, that's a weak hand your playing. Why don't you come right out and ask for a basin of water and a piece of soap? Beating around the bush your way is too thin. It won't wash, and neither will you. What do you expect to make by lying like that? Now, the fact is I was not lying, but I saw how stupid my question was, and I made up my mind to take the man's advice. I told him so, too, and he's the fellow that gave me the suit of clothes. He keeps a wood-yard in Louisville, and I'll never forget him.

"The only railroad pass I ever asked for or refused was on the Texas & Pacific road. I went into the office in Marshall and asked for a trip pass. 'What do you want with a pass?' said a gruff man. 'Well, sir,' said I, 'I want to go beyond Fort Worth to see how the land lays for hog raising.' The man laughed, looked at my seedy clothes and dark skin for awhile, and jumped up with a laugh and a swear, and said: 'By thunder, I will give you a pass? When you get to that country commence on yourself.' I took the pass, tore it up in front of his face, and told him I wouldn't think of going to any place where he had been raised. I never forgot or forgave that insult. I went out, and in a few hours I was riding on a passenger train to Fort Worth, under the protection of as good a conductor as ever punched a ticket. I did not like the country much, so I doubled the road next day, and a week afterward I was drinking beer in Milwaukee. You see, men out on the road go just where the spirit moves them. I was in Denver three years ago, and I picked up a newspaper containing an article descriptive of a Florida orange picking. I didn't believe the yarn and I made up my mind to go and see for myself. In 10 days I was on the ground personally and I saw that what I had read was true as gospel. Florida is a poor country. Oranges retail for less than they cost in New York. I skipped out of the country mighty fast.

"I was in Chicago when Jesse James was shot. I made up my mind to go to his funeral. So without a cent in my clothes I got on a through express that same morning, and I caught up to the funeral train before it got into the county where James was buried. It was a sickly show and didn't pay for the trouble. One season I followed up the Chicago base-ball club and saw nearly every game they played; yet I never spoke to but one man on the nine, and never spent a dollar on the trip, East or West. I used to talk a little among the strangers about base-ball and the Chicago club, and when they saw I was well booked and dead broke, I generally left the grounds with enough for a good square supper anyhow. I had a way of getting in to see games which is a patent of my own, and I don't care to give it away just yet. Ticket takers at base-ball grounds are not the worst in the world, and a friendly player can do a heap. Well, as I've said that much, I'll go further, and give you the whole story. When I showed up in a dozen places or more, and was recognized by one of the players, he took an interest in me, and always worked me in. He many a time wondered how I followed them up, but I let him guess it. That way I followed up the Bostons when they were the champions. I never traveled with any but the top of the heap. One time in Providence I was shut out of the grounds, because my friend was suddenly taken sick with a fever and couldn't get out of the hotel. I had 50 cents in my pocket, and I went and bought the nicest bowl of oyster broth ever made in a restaurant, and I sent it up to his room with my card. I didn't see him until a week afterward, when he told me it was the first and only thing he had eaten for three days, and it had helped him wonderfully. He never forgot that little train. I would not follow a circus, because it is too dangerous. Police pick you up for a thief on a circus day quicker than a wink.

"Never beat it on a steamboat, or you run the chances of being heaved overboard. Never get on a passenger train, or any other train, without you first have a talk with one of the crew. Then, if you can't make the rifle, and you are in a hurry, why jump on when the train's pulled out, and, if they order you off, why get off at the next station, and jump on again when she starts. You'll get there after a while if you don't wear out."—*New York Sun*.

RAILROAD LAW.

The Georgia Railroad Law.

In the case of the Georgia Railroad & Banking Co. and Wm. M. Wadley, Lessee, against the Railroad Commissioners of Georgia, the Superior Court of that state has refused plaintiffs' application for an injunction to restrain the Commissioners from enforcing compliance with rates fixed by them for freights over the Georgia road. The decision is a long and elaborate one, the chief points in it being as follows:

1. The case is a proper one for an equity suit, and the form and manner of bringing the suit is correct.
2. The plaintiffs have not, however, such an interest in the case as will warrant the Court in interfering in their behalf by injunction. The Georgia Railroad & Banking Co. has not such interest, because it has leased its road to Wm. M. Wadley for 99 years for a fixed yearly rental; Mr.

Wadley has not such interest, because he has transferred the lease to the Central Railroad Co., of Georgia, and the Louisville & Nashville Co. for \$25,000 in money and other valuable considerations to him made. Upon the right of the Georgia Co. to make the lease and of Mr. Wadley to assign it, the Court does not consider it necessary to pass in the present suit.

3. The right of the Legislature to delegate the power to regulate rates to a commission must be held as established.

4. The section of the charter of the Georgia Co., authorizing it to charge for the transportation of passengers and freight over its road and prescribing certain maximum rates, cannot be held to be such a contract as will bar the Legislature from any further interference with or regulation of rates.

The injunction is refused.

Obligation to Run Trains.

In the matter of the application of J. W. Wheeler, the New York Supreme Court has decided to grant a writ of *mandamus* to compel the Long Island Railroad Company to run trains over a certain portion of the leased Brooklyn & Montauk road, and to stop them at Locust avenue station, the Court holds that the running of one train a day is only a colorable compliance with the law, and that, while the details and method of operating the road must be left largely to the discretion of the company, a substantial compliance with its obligations to the public cannot be avoided under a pretense of exercising discretion. The company must comply substantially with its obligations to the public, and such compliance may be enforced by *mandamus*. The writ is therefore granted.

The Vermont Central Case—Priority of Receiver's Debts.

In the case of Langdon and others against the Vermont Central, the Vermont & Canada and others, the decision of the Vermont Supreme Court substantially reverses a former decision of the same Court, the chief points being briefly as follows:

1. The management of the Vermont Central trustees and of the Central Vermont Co. is held to be substantially a receivership under direction of the Court of Chancery and not merely a management by consent as in the former decision.
2. The Vermont Central bondholders and the Vermont & Canada Co. must be held as having, by their representatives, consented to the receivership and to the acts of the receivers and managers.
3. The various debts and liabilities incurred by said receivers and managers and by the Central Vermont Co. as their successor, must be held—with a few specified exceptions, into which further inquiry is to be made—to be a lien in the nature of an equitable mortgage on the roads, taking precedence of all other liens.
4. The Vermont Central bondholders and the Vermont & Canada Co. must be given an opportunity to redeem their property by paying off these debts and liabilities. Failing to redeem, they must be held to be foreclosed and barred of all right and title in the property, and the roads will be transferred to a trustee in the interest of the so-called trust creditors.

The case is remanded to the Court of Chancery, with directions to ascertain and determine the amount of trust debt and to carry out in all respects the mandates of the Supreme Court.

THE SCRAP HEAP.

New Parlor Cars.

On Monday next, two handsome parlor cars are to be put on the through train of the Boston & Maine railroad, and two more are nearly completed. The two cars already arrived are numbered 123 and 146, and for a few days past they have been running on local trains (locked, however) for the purpose of getting into smooth running condition. Both cars are painted outside a handsome dark maroon, and have a panel on each side marked "Parlor car," with the number above. No. 123 is one that was wrecked in the Cole's Corner accident last January, but it has been thoroughly overhauled, and is in effect a new car. It has compartments at either end, with a general open parlor in the center. The floor is covered with a handsome Wilton carpet, large cushioned revolving chairs are provided; the windows, all double size, are furnished with self-acting curtains and rich lambrequins. The interior finish is of mahogany, birch and maple. No. 146 is a new car, and differs materially from any others on the road. The interior finish is mainly California mahogany, though other hard woods are worked in to give a pleasing variety. The windows are alternately narrow and wide ones, and this arrangement brings each room opposite a window. At one end of the car is a state chair extending across the car, provided with four large revolving chairs and shut off from the rest of the car by a door. Adjoining this state room is a passageway, on one side of which is a double room for ladies, one of which contains a marble bowl and a small state room for two persons. On the other side is a wash room for gentlemen, a heater room and a small state room. The balance of the car is occupied by the main parlor, which is furnished with 16 large, handsome and comfortable arm chairs, upholstered in red plush. The windows are furnished with curtains and lambrequins, like those in No. 123, and the floor is carpeted with a beautiful Wilton. Both cars are provided with double lamps, and the windows have gauze screens, beside double fenders outside. The running gear is of the best, and all the modern appliances for safety are provided. The cars come from the company's shops, and will prove welcome additions to the rolling stock of the road.—*Boston Herald, July 15*.

A Narrow Escape.

Last Wednesday evening, about 8 o'clock, quite a thrilling (but fortunately not fatal) accident occurred on the big trestle between Henry's and the Swannanoa tunnel, on the Western North Carolina Railroad. The east-bound passenger train, with quite a number of travelers on board, had emerged from the big tunnel and was slowly winding its way down the mountain, and had reached the high trestle, near which the old saw-mill is located, when the accident occurred. The engine had gone two-thirds the way across the trestle, when the front driving wheel, on the right-hand side of the engine, snapped square off at the point where the axle joins it, and it would have been hurled to the ground far below but for the connecting rod which held to it. The train was going slow at the time, and when the wheel snapped off a terrible jarring was felt, but fortunately neither engine nor cars left the track. At the first shock the engineer applied the air brakes and checked the speed of the train, which rolled on for about twenty yards and stopped, with the engine in the cut, and the cars standing over the big fill-up, at the end of the trestle.—*Charlotte (N. C.) Observer, July 14*.

A Good Run.

On Monday night of last week, with engine No. 322, Chicago, Burlington & Quincy, Mark McGlenn hauled a stock train from Galesburg to Mendota, 80 miles in four hours, without stopping—and he took no water until reaching Earl, 10 miles this side of Mendota.—*Aurora (Ill.) Beacon*.



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EDITORIAL ANNOUNCEMENTS.

Passes.—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

PROBABLE IMPROVEMENTS IN FREIGHT CAR CONSTRUCTION.

That an ordinary freight car is rather a rude piece of mechanical construction will be admitted by all who have any intimate knowledge of its anatomy or physiology. There would, though, be great risk in attempting to prophesy, with any definiteness, precisely what improvements will be made in cars. Still there are some tendencies at work which may be distinctly recognized, and some well-established principles, which, if applied to the problem of car construction, will indicate, with more or less certainty, the direction which future improvements will be quite certain to take.

In the first place there is the general principle that the cost of construction, maintenance and operation of various kinds of structures does not increase in the same proportion as their size and capacity. A box one foot square will have one cubic foot of capacity, and the area of its sides will be six square feet. One two feet square will have eight times the capacity, but the area of its sides will be only twenty-four square feet, or four times that of the smaller box. In other words the area of the sides of such a box increase as the square of the dimensions, whereas the contents are as their cube. This principle applies to all structures, houses, ships and cars. Besides this, the cost of most of the parts of cars is not increased in proportion to their strength. That is, they may be made twice as strong and not be doubled in cost. For these and other reasons it is more economical, in most cases where there is a heavy traffic, to use large cars, and this fact has manifested itself in the very general increase of the carrying capacity of freight cars from ten to twenty tons, and now, in some cases, thirty-ton cars are being made. The tendency to an increase of capacity shows itself, too, in the construction of larger ships, larger hotels, and in our cities larger houses for the accommodation of more people. It is not probable that we have reached the limit of size and capacity of cars, nor for the present purpose is it necessary that the limit should be known or indicated. Probably the increase will be made in conjunction with, or rather as a consequence of, the laying of heavier rails and the improvement of the substructure, so that it will be more worthy of the name of "permanent way" than it now is in many cases. Of the potency of the economic law which produces the tendency to increase the capacity of cars there can be no doubt, and there is no reason

at all apparent now for thinking that the tendency will be arrested or changed.

Of course the cost of cars is increased with their capacity, although in a smaller proportion. The loss resulting from their being thrown out of service is also greatest with the most expensive cars. In most cases it would be as expensive to a railroad company to have a twenty-ton car thrown out of service as it would be to lose the use of two ten-ton cars. It is also obvious that a railroad company can afford to spend as much money on the draw-gear, for example, at each end of a twenty-ton car, as it does on the four ends of two ten-ton cars. The same principle will apply to other parts. Trucks for twenty-ton cars, even though they cost twice as much as those with a capacity of only ten tons, would be no more expensive.

It follows, from what has been said, that if the capacity of cars is increased, railroad companies can afford to improve their construction, and as the loss from large cars being out of service will be greater than it is when small ones are laid up, it will be economy to improve the construction, if by doing so fewer repairs will be needed. It therefore seems probable that improvements in the design and the character of the workmanship of cars—especially the running gear—could be made with great resulting advantages. Attention has heretofore been called in these columns to the great rudeness in the construction of car trucks. Cast-iron chilled wheels are seldom or never perfectly round or of the same diameters. Neither are they true laterally. They are put on the axles often incorrectly gauged in relation to each other, and still oftener not in the right position in relation to the journals. The flanges and tread are shaped not in accordance with any established law, but are made by each wheel manufacturer "by his eye," and no two makers use the same shape of flange. The journal-bearing consists of one rough casting, which is inserted into the box, which is a still rougher one. The latter is bolted to the frames, which are usually rough bars of iron, and are secured in position in relation to the other boxes, with such chance of being square or in line with the others as the care, or the want of it, of the workman may secure. The frames are attached to the bolsters by means which are often far from being secure, and therefore, soon "get out of square." The centre-plates are bolted to the truck and usually take their chance of being in the true centre, and so on to the end of the tale.

It should be remembered here, that while nearly all the freight-car trucks in use are now made of iron, they have generally been designed by wood-working mechanics. It of course does not follow that because a person knows how wood-work should be done, therefore he does not know how to design a structure to be made of metal. But it is more probable that a person skilled in metal work will know how it should be done than he would if he were not skilled. The fact that car work has generally been in charge of those without any special or high order of skill in that kind of construction, taken in connection with what has been said, makes it additionally probable that there is great room for improvement in the iron work of cars.

What may be expected is that wheels will be either turned or ground true and of the same diameter, and that much greater care will be taken to have them correctly gauged in the axles and placed in the proper positions in relation to the journals. Next, that the journal bearings will be trued up to exact sizes in some way, and that their seats in the boxes will also be made true either before or after they are bolted to the frames, and that the latter will be made stronger and stiffer and in every way of better workmanship, the bolts being accurately fitted and the surfaces in contact in some if not all cases planed.

The future construction of the draw-gear is, however, difficult to anticipate. Great pressure is being brought to bear on railroad companies to adopt an automatic coupler. Whether that will be done, or whether the draw-gear of the future will be, not automatic, but of a kind that will admit of cars being coupled without going between them, which will be called outside couplers, is still an open question. The thousands of patents which have been issued for self-couplers does not make it any easier to foresee what will be done. The difficulties in the way of adopting any self-coupler are very great. In the first place, there is the problem of finding one which will work satisfactorily—a problem which it is not certain is yet solved by any of the patents. In the next place, if such a device is found, it will be of very little use unless it is generally adopted. It is of course possible that different kinds of self-couplers might be found, which would work together satisfactorily, but to find such increases the first difficulty, as it is of course easier to find one form of coupler that will work well, than to

find two or three which will work well and at the same time work with each other.

It is, therefore, not easy to see how the pressing need of a self or outside coupler can be supplied. Of course, if the railroad companies would have an exhaustive investigation of the subject made, by some one or more persons competent for the work, a conclusion might be arrived at. This they are not likely to undertake, and if they did it is not probable that a person with the requisite qualifications for the work could be found, and if he could, that he would be selected.

It has been suggested that a private corporation should be organized to make this investigation, and that after determining which are the best couplers, that the company then acquire the patents and through its influence procure the general adoption of that which their investigations indicated was the best. This would be a novel use to make of corporate power and capital, and would, in fact, be applying it to scientific research. The patents to a self-coupler which could be generally introduced would, of course, be very valuable. There can be no doubt that the increase in the capacity of cars enables railroad companies to spend more money in the coupling apparatus, for the reasons already explained.

The same thing is true of brakes. The cost of applying and maintaining the apparatus for continuous brakes is very much less if it is applied to a thirty-ton car instead of three of ten tons capacity. It seems, therefore, that this problem has assumed the form of finding, not a brake to suit our cars, but a car to suit the form of brakes now in use.

It seems probable, too, that the use of iron or steel instead of wood may be determined by the same causes. The amount that can economically be expended to prevent decay depends entirely upon the cost of a structure. Thus railroad companies in this country, thus far, have not thought that they could afford to creosote their cross-ties, whereas in Europe, where they are more expensive, that process is very generally employed. Wooden trestles are seldom or never roofed over for protection, whereas bridges often are. Iron frames have thus far not been considered economical for cars, but are much used for tenders, although probably for the reason that they are exposed to dampness more than they are in cars. Nevertheless, it may be profitable to use iron frames for twenty or thirty-ton cars, when it would not be on those heretofore used. Probably, too, the use of some of the processes for preventing iron from rusting, such as galvanizing it, or the Barff process, which is about to be introduced into this country, may also stimulate the substitution of iron for wood in construction. It is probable, too, that the fact pointed out above, that nearly all master car-builders are wood-working mechanics, has also delayed somewhat the use of iron in car construction; but the other fact, that in England, where wood is dearer and iron cheaper than here, the latter has not, to any very great extent, superseded the former, indicates that probably we have gone ahead quite as rapidly in that direction as the circumstances would permit.

To sum up, then, what may be expected is that the capacity of freight cars will be still further increased, that the design and the quality of the workmanship will be much improved, that they will have continuous brakes and outside or automatic couplers, and will be in many ways more costly structures than those we are now using.

BREADSTUFFS EXPORTS AND RAILROAD EXTENSION.

The report of the Bureau of Statistics for the month of June completes the statement of the breadstuffs exports of the whole United States for the government fiscal year, which begins about a month earlier than the crop-year of small grains. The statement for June is an exceptionally bad one, as was to be expected. The exports of the leading staples in it were:

	1882.	1881.	Decrease.	P.c.
Corn	1,071,039	8,943,761	7,872,722	88.0
Wheat	4,434,885	10,090,608	5,655,723	56.0
Flour (bu.)	1,986,336	2,673,058	686,722	25.7
Other grain	215,376	306,291	90,915	29.7
Total	7,707,636	22,013,718	14,306,082	65.0
Total value	9,247,466	20,605,678	11,358,212	55.0

Thus the total exports this year were little more than a third of the June exports last year, and the corn exports especially fell off seven-eighths. The prices were so much higher this year, however, that there was a decrease of but 55 per cent. in the aggregate value of the exports, against 65 per cent. in the number of bushels.

San Francisco did not lead in wheat exports in June, as it had done for two or three months previous, but San Francisco and Portland, Or., exported more than 40 per cent. of the total, against New York's 42.8 per

cent., and from other ports the exports were but trifling.

For the half-year ending with June, the exports were:

	1882.	1881.	Decrease.	P. c.
Corn.....	10,179,892	39,514,405	29,334,513	74.2
Wheat.....	32,898,272	58,244,986	25,346,714	43.5
Flour (bu.).....	13,000,275	17,422,965	4,422,690	25.4
Other grains.....	1,234,756	1,738,092	503,336	29.0
Total.....	57,313,195	116,921,048	59,607,853	51.0
Total value.....	\$64,833,581	\$111,980,917	\$47,147,336	42.1

The decrease was 51 per cent. in the aggregate for the half year, and 74 per cent. in corn. The latter grain made up 33.8 per cent. of the whole last year, but only 17.7 per cent. this year.

For the 12 months ending with June, the exports were:

	1882.	1881.	Decrease.	P. c.
Corn.....	43,148,888	91,349,817	48,200,929	52.8
Wheat.....	92,857,276	149,453,771	56,596,495	37.8
Flour (bu.).....	25,799,373	35,437,329	9,637,956	27.2
Other grains.....	1,840,012	4,907,978	3,067,966	62.5
Total.....	163,645,549	281,148,895	117,503,346	41.8
Total value.....	\$176,977,496	\$293,561,091	\$116,583,595	39.7

Not much more than half of the total decrease of the year was in the last half-year; but there was a decrease of 29,000,000 in corn in the first half of this year, against 19,000,000 in the last half of last year, while in wheat and flour the decrease was 36,000,000 in the last half of 1881, and but 30,000,000 in the first half of 1882.

But this only shows that the crops which are harvested in July and August showed the effect of the bad yield a few months earlier than the crop which is harvested chiefly in November and December. This latter, the corn crop, will doubtless compare very unfavorably with 1881 all the rest of the year.

The vastness of this decrease in our leading export is easily seen, but it should be remembered that the exports of the two previous years were the largest in our history. Omitting the minor grains (always trifling in amount), the exports of wheat, flour and corn, in bushels, for seven successive years have been:

Year.	Bushels exported.	Year.	Bushels exported.
1875-76.....	124,244,254	1879-80.....	278,474,057
1876-77.....	127,904,919	1880-81.....	278,239,790
1877-78.....	177,601,134	1881-82.....	161,805,537
1878-79.....	233,983,901		

Thus our exports are not only 42 per cent. less than in 1880-81 and 1879-80, but are 38 per cent. less than in 1878-79 and even 9 per cent. less than in 1877-78. And even this does not show the whole effect of the bad crops in the greater part of the country, from the fact that the exports from the Pacific coast last year were much larger than ever before. Those from San Francisco were 20,000,000 bushels more than the year before, and if we take the Atlantic coast by itself we will find that the exports fell from about 250,000,000 bushels to 112,000,000; and this latter is about the amount of Atlantic exports previous to the harvest of 1877. The reason why this tremendous decrease has not been more felt is, first, that it follows four years of large crops and exports, and, second, that prices were exceptionally high. Thus the values of the breadstuffs exports for the seven years were:

Year.	Value.	Year.	Value.
1875-76.....	\$129,026,080	1879-80.....	\$283,639,551
1876-77.....	115,653,571	1880-81.....	285,561,091
1877-78.....	178,257,262	1881-82.....	176,977,496
1878-79.....	207,115,059		

The decrease in value is 33½ per cent. from 1881, 37½ per cent. from 1880, 15 per cent. from 1879, and ¼ per cent. from 1878.

Omitting the Pacific coast exports, the values were \$130,622,136 last year against \$240,306,349 in 1880-81—a decrease of 45½ per cent.

The breadstuffs export business did not become large, in the sense in which we call it large now, until the great crop of 1873; its growth is largely the result of the extension of railroad construction in the Northwest. In the five years before the war (1856-60), the average yearly value of the breadstuffs exported was but \$40,609,000—not a quarter of the "small" business of last year. In the five years 1861-65 the value of these exports was still, on the average, but \$72,821,000, and this in greenback value, the average number of bushels exported yearly being less than 60,000,000.

We will trace the course of these exports later by the help of the following table, which gives the number of bushels and the value of the breadstuffs exports for each of the last 19 fiscal years:

Year.	Bushels.	Value.	Year.	Bushels.	Value.
1863-64.....	47,170,791	\$92,244,205	1877-78.....	191,210,925	\$178,257,262
1864-65.....	27,084,768	\$52,268,715	1878-79.....	233,983,901	\$207,115,059
1865-66.....	32,060,439	\$63,924,067	1879-80.....	278,474,057	\$283,639,551
1866-67.....	29,720,151	\$57,944,969	1880-81.....	278,239,790	\$285,561,091
1867-68.....	39,503,209	\$77,351,840	1881-82.....	161,805,537	\$176,977,496
1868-69.....	38,639,455	\$72,335,291			
1869-70.....	56,610,750	\$109,667,846			
1870-71.....	63,819,573	\$126,953,933			
1871-72.....	75,899,933	\$150,066,974			
1872-73.....	93,968,932	\$187,232,877			

In the next five years, from 1866 to 1870, the average annual value of breadstuffs exports fell to \$54,000,000 and the quantity to 49,400,000 bushels. The increase can hardly be said to have begun until after 1868-69. For the six years then ending the average quantity ex-

ported had been 36,000,000 bushels, and in the latter year but 38,600,000. But from 1869 to 1870 there was an increase of 46 per cent. (in bushels), from 1870 to 1871 the increase was 12.7 per cent., from 1871 to 1872, 19 per cent., from 1872 to 1873, 24 per cent., and from 1873 to 1874, 39 per cent.

This period of five years, from July 1, 1869, to the same date in 1874, was the first period of great increase in grain exports; the gain in this period was from 38,630,000 bushels (1868-69) to 130,500,000 bushels (1873-74), or 238 per cent.

This was a period of great railroad extension. For ten years previously the exports had been almost stationary, though in those ten years also there was a great increase of railroad construction, our system having increased about 64 per cent. from 1859 to 1869, and nearly 34 per cent. from 1865 to 1869, when there was no increase in grain exports. It would appear, then, that the increase in grain production and exports follows railroad construction after an interval of a few years, and not immediately, and this conclusion is confirmed by the second great increase in production and exports, which did not begin in 1874-75, after the greatest railroad extension the world had ever seen (just 50 per cent., or 23,400 miles, from the end of 1869 to the end of 1873), but not till 1877-78. The exports were nearly stationary for four years, beginning with the crop-year 1873-74, averaging 124,300,000 bushels a year. The next year (1877-78) they rose to 191,000,000 bushels, and in 1878-79 to 246,600,000; yet from 1874 to 1878, inclusive, the increase in our railroad mileage was but 11,500,000 miles, or 16½ per cent. We then attribute the increase in grain exports from 1876 to 1879, so far as it was caused by railroad construction, to the extensions for the four or five years previous to 1874.

And this conclusion as to the time required after railroad construction before its effect is fully felt in agricultural production is further confirmed by our most recent experience. During the last two and a half years we have built about 21,500 miles of railroad, increasing our mileage 25 per cent.; but we do not dare to hope that the crops of 1882 will equal those of 1879. Of course, much is due to the difference in seasons; but the growth of agriculture is seen most unmistakably in the acreage under cultivation. Now, taking all the cereal crops together, it appears there is very little increase in acreage this year over 1881. The Department of Agriculture reports one of 4 per cent. in corn and a larger one in oats, which is so far counterbalanced by a decrease in the wheat acreage that there can hardly be an increase of as much as 2,000,000 (1½ per cent.) in the total cereal acreage. And the slow growth in the previous three years of great prosperity and rapid railroad construction is unmistakable. The figures, as reported by the census for 1879 and the Department of Agriculture for the two following years, were:

	1879.	1880.	1881.
Acres in cereals.....	117,783,400	120,163,000	122,559,000

Here we have an increase of nearly 2 per cent. from 1879 to 1880, and of 2 per cent. from 1880 to 1881. This is not standing still, to be sure, but an increase of less than 6 per cent. from 1879 to 1882 does not indicate such a growth as that from 1876 to 1879, or from 1870 to 1873. The increase of 25 per cent. in railroad mileage must for the time be supported by something else than the increase in grain production, and we may say by something else than the increase in agricultural production, for the cotton acreage (which increased greatly just before 1880) is reported this year as 2.6 per cent. less than 1881, and but 2 per cent. more than in 1880.

The truth is that the effect of railroad construction on agricultural production is much exaggerated in the popular estimation, and also in the estimation of the well informed public. It is only where new country is opened that railroads have a great effect on this industry. It is questionable whether an acre more is cultivated by reason of the reduction of distance from the farm to the station to less than 10 or 12 miles. Any one who has been intimately acquainted with the course of agriculture in a new country from the time it was first settled until it has been thoroughly cut up by railroads will, we think, bear us out in this assertion. In states as old as Ohio, Michigan and Illinois, scarcely any land was left uncultivated by the time it was within 15 miles of a railroad. Sometimes important changes in the character of the crops have been made by the nearness of a railroad. The farmer with capital might raise stock to eat his grain, in preference to selling the grain, when he could barely haul one load a day to the nearest station; and yet there are not many farmers who raise so much grain as to make the marketing of it at the rate of a load a day very burdensome, as much of it can be done

when for other reasons a visit to the station is necessary. There is a transformation of farm industry sometimes following railroad construction which is not caused by that where the transformation takes place, but by the opening of some other country. This has been the case to some extent in Central Illinois. There, years ago, cattle-growing was perhaps the chief industry. The farmers grew corn which they fed chiefly to cattle and hogs, and raised comparatively little wheat. In 1873, for instance (a good year for wheat), it had 2,105,000 acres of wheat; in 1880 its total area under cultivation meanwhile having increased but 1,000,000, or less than 8 per cent., the wheat acreage was 3,650,000, an increase of 73 per cent., and the great stock farms of the earlier period had almost disappeared, and this not because of more railroads in Illinois, but because of more railroads in Kansas, Nebraska, Colorado, etc., which have brought a vast territory good for nothing but grazing into competition with the Illinois prairies, which are good for grain-growing as well. Transformations over limited area, especially in the vicinity of cities, have been even more complete and striking, and often have been made possible only by the railroads.

The late issue of Poor's Manual, which should be better informed, makes a most extravagant statement of the effect of railroads on agriculture. The introduction has a table to show "the beneficial effect of railroads," in which the miles of railroad and the numbers of bushels of wheat and corn in several Western states in 1870 and 1880 are compared. It finds in the eleven states from Ohio and Michigan to Kansas and Dakota an increase from 634,000,000 to 1,602,000,000 in wheat and corn production, coincident with an increase from 22,738 to 44,647 in miles of railroad. But there are several facts to be noted before we conclude that this increase in production was caused by the increase in railroads. In the first place, the whole comparison is vitiated by the fact that the corn crop of 1869 (which is that given by the census of 1870 and in the Manual given as the crop of 1870) was one of the worst ever harvested, and as exceptionally bad as that of 1881. It will be much more accurate to compare 1869 with 1881, and if we do that we shall find an increase not of 967,000,000 bushels (152½ per cent.) over 1870, but of 427,200,000 bushels, which is only 68 per cent., and the number of bushels per mile of road in these states, which was 27,889 in 1869, was only 21,724 in 1881.

The year following that covered by the census of 1870 the corn crop was 333,000,000 bushels greater for the whole country, and most of the increase must have been in these eleven states, and it would be much fairer to compare this good year 1870 (when wheat, however, was below an average) with the good year 1879 or 1880, which would show for the whole country an increase of about 900,000,000 bushels, or 67½ per cent. instead of 1,184,000,000, or 113 per cent., if we count from the unfavorable year 1869, as the Manual does. Thus the rate of increase from the good year 1870 to the good year 1879 or 1880 (crops nearly the same in both of these years) is nearly the same as that from the bad year 1869 to the bad year 1881; and this rate of 68 per cent. actually represents the growth of production within the last decade, with average crops, while the increase of 152 per cent. from 1869 to 1879 in the eleven states as given by Poor, though correct for these two particular years, grossly exaggerates the rate of growth.

Further examination would show that of the 967,000,000 bushels increase, shown by Poor's table from 1869 to 1879, no less than 367,000,000 was in the three states of Ohio, Indiana and Illinois, which were nearly fully supplied with all the railroads required for grain production as early as 1870.

Since 1870 a vast area has been made accessible for grain production in Iowa, Minnesota, Dakota, Nebraska and parts of Missouri by the construction of new railroads, but very little (at least since 1873) anywhere this side of the Mississippi, where, nevertheless, there has been a great increase in grain production, nearly all of which would have occurred, we venture to say, if there had been no addition to the railroads of those states. Other industries have been greatly promoted by railroad construction in many of these states, and agriculture perhaps made more profitable, though this is by no means certain; and the fact that the average value of farms was about as great in 1873 as it is now in this comparatively old country—rather greater than if we count by the interest obtainable on the valuation—does not indicate that the farms have been made more profitable by the multiplication of railroads, where before there were enough for the farmer's purposes. The farmers' families doubtless lead pleasanter lives because of the nearness of stations, however, and though this is not always

accounted for in the selling price of farms, it has an actual if not an economical value.

It should not surprise us that the effect of railroads on production even in new countries should be quite gradual. Farms are not made in a day or a year. The immigrant who becomes the owner of 160 acres of fertile prairie in Iowa or Dakota does not usually get it all under cultivation for six or eight years, and of course all the land in the new country, even when immigration is greatest, is not taken up for some years. Northwestern Iowa has been tolerably accessible now for ten years, but the ground under the plow there is still but a very small fraction of all that is fertile and tillable.

Within the next three or four years we shall probably see much more plainly than we do now the effect of the railroads built there and in Minnesota, Dakota, Nebraska, etc., on agricultural production.

RECENT PASSENGER DECISIONS.

Late volumes of court reports bring an unusual number of decisions on carriage of passengers.

Rights of Colored Persons.—In an Ohio case the plaintiff was a colored woman, who, accompanied by her husband (a clergyman), and carrying a sick child, bought a first-class ticket over the Cincinnati Southern Railroad, and went to the train to take her seat. There were two cars on the train, the rear one a ladies' car, the forward a smoking car. The brakeman in charge of the ladies' car refused to admit the wife, because colored. She then remained behind, made her trip by another route, and brought suit for damages. There was no dispute that she was a lady-like, well-behaved person. The judge told the jury that railroad companies have the right to set apart one car for ladies and another for gentlemen, and perhaps may make a regulation that colored people shall ride in one car and white people in another. But if they separate ladies and gentlemen, they are bound, whenever a gentleman pays for a first-class ticket, to provide for him such accommodations as they ordinarily provide for ladies; "for the gentleman's money is just as good as the lady's, in the eye of the law;" and they are bound to provide for him such reasonable accommodations as he has paid and contracted for. Or if they assume to separate colored persons from white, they must give the colored race equally good accommodations. This company was bound to provide for plaintiff such accommodations as were provided for white women, for in the eye of the law all stand now upon the same footing, whatever the social relations of life may be. If the company refused to give her such accommodations, she was not bound to ride in the smoking car. And the jury awarded her \$1,000 damages.

Tickets.—In New York, a Mr. Auerbach, in September, 1877, purchased a coupon ticket from St. Louis to New York, the last coupon of which was good from Buffalo to New York. It was specified upon the ticket that the purchaser agreed to use it on or before Sept. 26, 1877, and that if he failed to do so, the carrier might refuse to accept it. Wishing to stop at Rochester, Mr. Auerbach purchased a ticket of the New York Central Railroad Company from Buffalo to Rochester. On the afternoon of Sept. 26 he got on a train at Rochester to complete his trip to New York. He then presented his original ticket, with the one coupon attached, to the conductor, and it was accepted by him, and was recognized as a proper ticket and punched several times until the plaintiff reached Hudson, about 3 or 4 o'clock in the morning of Sept. 27, when the conductor declined to recognize the ticket on the ground that the time had run out, and demanded \$3 fare to New York. Mr. Auerbach declined to pay, and the conductor ejected him with force from the car. The Court of Appeals has decided against the course taken by the conductor. The opinion says that Auerbach was limited to a continuous passage; that he could not enter one car of the defendant's train and then leave it and subsequently take another car and complete his journey. He was not, however, bound to commence his passage at Buffalo. He could commence it at Rochester, or Albany, or any other point between Buffalo and New York, and then make it continuous. When the plaintiff entered the train at Rochester on the afternoon of the 26th of September and presented his ticket and it was accepted and punched, it was then "used" within the meaning of the contract. It could then have been taken up. So far as the plaintiff was concerned, it had then performed its office. It was thereafter left with him, not for his convenience, but under regulations of the company for its convenience, that its agents might know that his passage had been paid for. The contract did not specify that the passage should be completed on or before the 26th inst., but that the ticket should be used on or before that day, and it was so used.

In Maine there is a statute (Laws 1871, c. 223) which

declares that the holder of a railroad ticket shall have the right to stop over at any of the stations along the line of the road, and that his ticket shall be good for a passage for six years from the time it is first used. A passenger on the Grand Trunk Railway, who bought in Portland a ticket for Montreal, "good only for two days," and started from the former city, was put off the cars after they had entered Canada, on the plea that he had delayed using the ticket till long after the two days expired. The judges in this case sustained the conductor's course. They said that the man could not have been put off in Maine, but that the Maine statute did not extend to Canada, and they could not assume that Canada had a like one.

Defective Roadway or Rolling-stock.—In a Pennsylvania suit for injuries to a passenger, no one disputed that he was badly hurt, nor that the injury was received in consequence of the train running into a chasm in the road-bed, caused by a wash-out. But the lawyers wrangled over the question whether the passenger must collect evidence that the management was to blame for the existence of the hole, or whether it was for the direction to show that they had used all proper precautions, and that the case was one of inevitable accident. The Court sided with the passenger. They said that by undertaking to carry passengers, the company engages to provide a safe road and sound cars; if injury results from defect of either, it is more reasonable to call on the company to prove that precautions were taken than on the passenger to show that they were not. The direction has means of knowing and proving what watch was kept, what repairs were ordered, what care was exercised. The passenger has no opportunity of knowing, still less of showing the truth as to these matters. The probability, when a train runs into a hole, is that some one has blundered.

A different aspect of the same principle is shown in a New York case, where the locomotive boiler burst and injured a passenger. On the trial, the lawyer for the passenger simply proved the explosion and the injury. The company's counsel then called the employees, who testified that the engine had recently been overhauled, tested, repaired and pronounced safe, by experts; that it was carefully managed at the time of the accident; and that the explosion was due to an undiscoverable flaw in the iron. The Court said that testimony of employees was open to some suspicion, but if the jury believed that the direction had employed all usual and prudent tests, the injured passenger could not recover. A railroad company is not absolutely liable for passengers' safety, but is only bound to use the highest care and foresight.

Excessive Speed.—In Indiana a train was thrown off the track, and an injured passenger complained that excessive speed was the cause. The company answered that "the velocity was no greater than what had been practiced before, with the tacit consent of the community, and without accident." The Court said that this was no test. Companies must not run their trains at a rate of speed which is excessive and dangerous; and what rate is prudent cannot be left to the opinion of the community. What would be a safe rate on one road or under some circumstances may be a very dangerous one elsewhere. The fact that on previous days a high rate has been tried and no harm was done is not conclusive that such rate was safe. The management should be prepared to show that the speed adopted is not imprudent.

Misconduct of Employees.—On a Chicago road a passenger, waking from a nap, found or believed that his watch had been stolen; and the conductor gave him leave to ride beyond the station to which he had a ticket, while a search was made. In course of the search, the passenger avowed that he suspected a certain brakeman of the theft—whereupon the brakeman struck him a violent blow with a lantern. For this the injured passenger sued the company. Two answers were made: 1. That after he had passed his destination he was no longer a passenger; and, 2, that brakemen are not employed to assault passengers, and a company is only liable for what they do in performing the duties for which they are hired. But the Court sustained the suit, saying that the duty of the company toward plaintiff as a passenger continued, under the circumstances, during the extra ride; and that to protect him from assaults by brakemen or others was a part of that duty. A company by undertaking to carry a passenger is deemed to engage that he shall receive kind treatment at the hands of its servants.

A case in the same Court, where a passenger obtained leave from the engineer (not the conductor) to ride free, and was killed on the trip, was decided in favor of the company, on the ground that an engineer has not authority to give leave of riding. That power rests with the conductor, subject to the rules. One

who travels on a train by mere permission of the engineer has not the rights of a passenger, and cannot demand the full care and precaution which fare-paying passengers are entitled to expect.

Alighting.—Cases in Missouri and Wisconsin discuss injuries to passengers who attempt to leave a moving train. The courts say that the management is bound to detain the train at the appointed stations a reasonable time for passengers to alight; if it is not stopped, but run very slowly to allow them to jump off, a passenger who is injured in carefully trying to do so is entitled to damages. But if it is stopped, and the passenger, being behindhand in leaving, leaps off after it has started again, his hurt is "his own fault," and he cannot sue. And such is the rule when a train runs by a station without slowing, though it ought to do so; the passenger cannot jump at the company's risk, but must remain in the cars and claim damages for being carried too far.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Central Iowa.—Track laid on a branch from New Sharon, Ia., northwest to Newton, 28 miles.

Denver & Rio Grande.—The *Pueblo & San Juan Division* is extended from Durango, Col., north to Silverton, 45 miles. Gauge, 3 ft.

East Tennessee, Virginia & Georgia.—This company's *Cincinnati & Georgia* line is extended northwest to Dallas, Ga., 10 miles. Gauge, 5 ft.

Galveston, Harrisburg & San Antonio.—Track is laid on the *El Paso Division* to a point three hundred and fifty-four miles east by south from El Paso, Tex., an extension of 25 miles.

Lehigh & Hudson River.—Completed by laying track between Andover, N. J., and Franklin Furnace, 11 miles.

Louisville, Evansville & St. Louis.—Track laid from Huntington, Ind., west 15 miles, and from Birdseye, Ind., east to Milltown, 30 miles, making 45 miles in all, and completing the road.

Louisville & Nashville.—The *Knoxville Branch* is extended from Livingston, Ky., southeast to London, 14 miles. Gauge, 5 ft.

Milwaukee & Northern.—On the *Wisconsin & Michigan Extension* track is laid from Green Bay, Wis., north to Stiles, 27 miles.

New Orleans Pacific.—Completed by laying track from Atchafalaya, La., northwest 18 miles.

Northern Pacific.—Extended from Gray's Bluff, Montana, westward 28 miles; also from Rock River, Idaho, eastward to Cabinet Landing, 35 miles.

Rochester & Pittsburgh.—Extended from Great Valley, N. Y., southward to Tarport, Pa., 15 miles.

Saratoga, Mt. McGregor & Lake George.—Extended northward to Mt. McGregor, N. Y., 4 miles.

Southern Pacific.—On the *Colorado River Branch* track is laid for thirty-one miles from Mohave, Cal., an extension of 10 miles.

Victoria Furnace.—Extended from Victoria Furnace, Va., to the Abrams ore banks, 10 miles. Gauge, 3 ft.

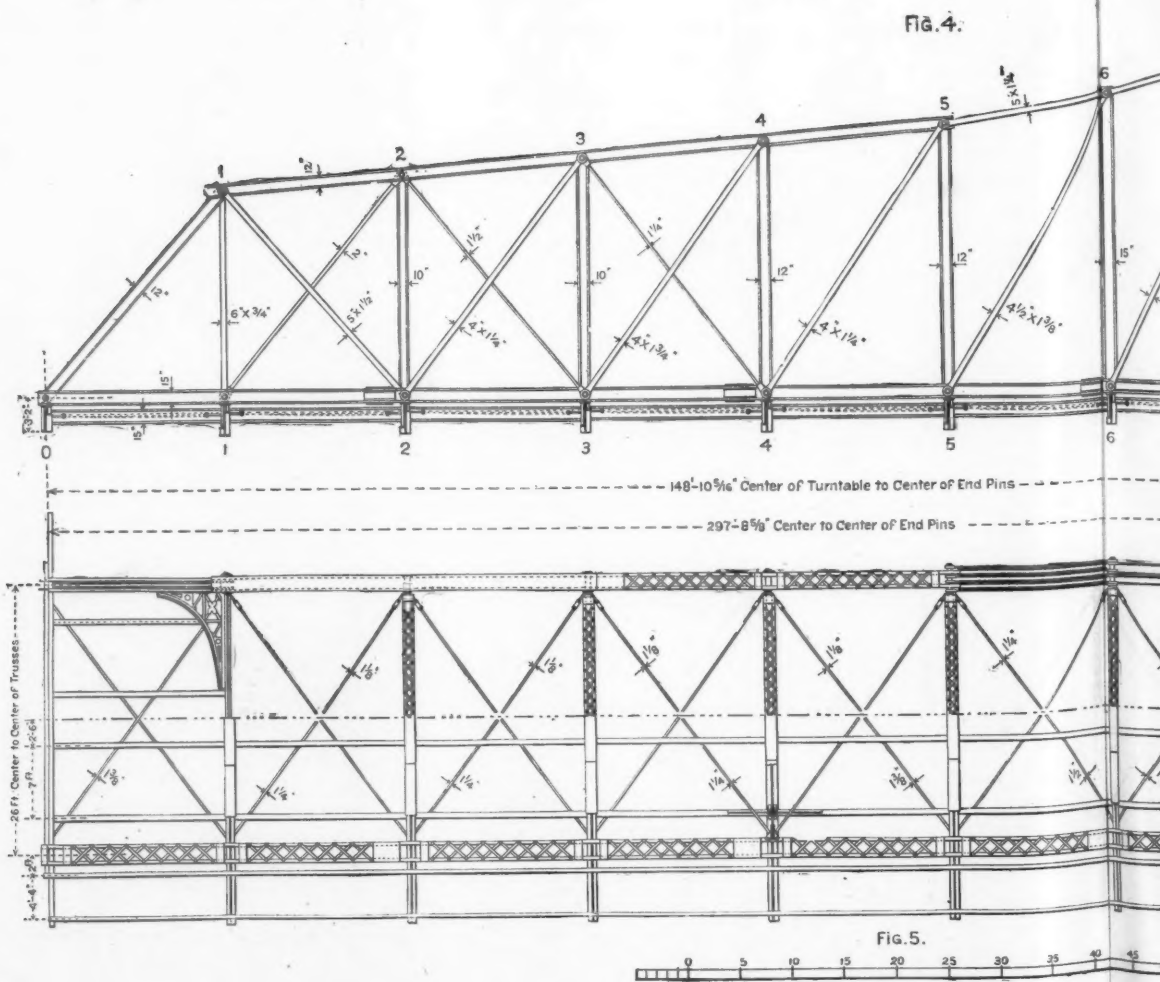
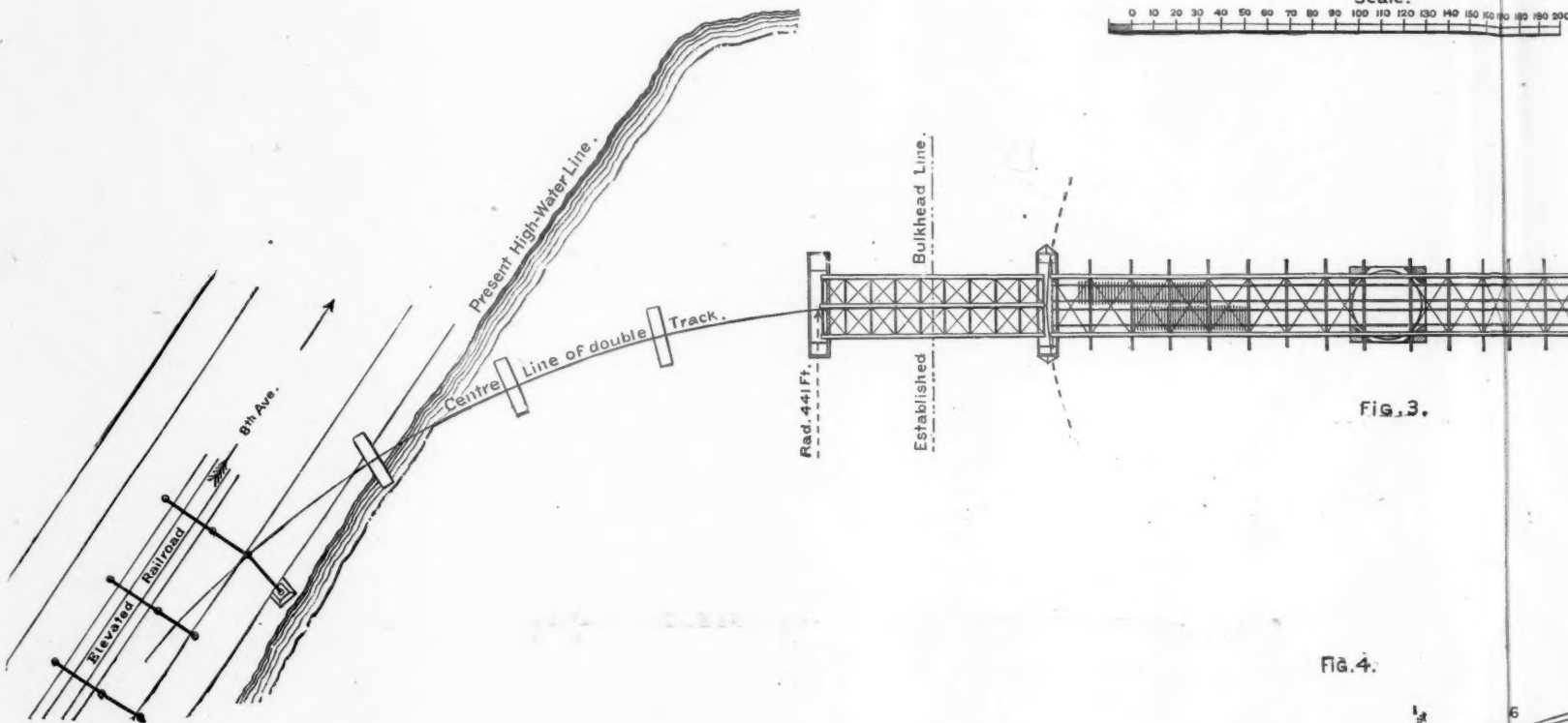
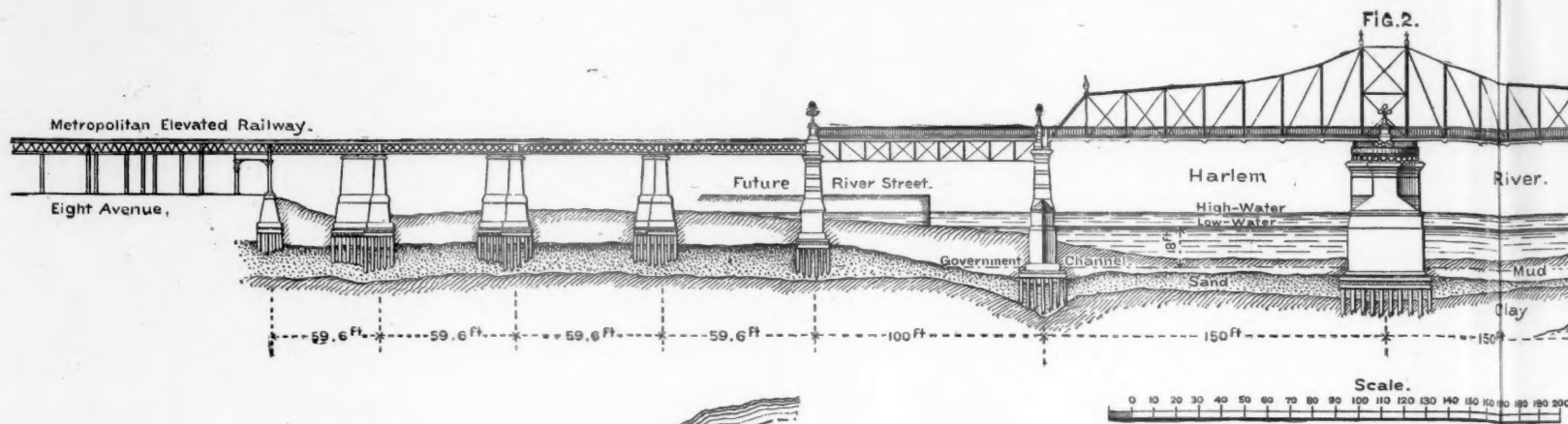
Western North Carolina.—The *Ducktown Branch* is extended from Pigeon River, N. C., south-west 5 miles. Gauge, 5 ft.

Wheeling & Lake Erie.—Extended from Massillon, O., southward to Zoar, 12 miles.

This is a total of 342 miles of new railroad, making 5,100 miles thus far this year, against 2,563 miles reported at the corresponding time in 1871, 2,375 miles in 1880, 1,083 miles in 1879, 819 miles in 1878, 731 miles in 1877, 932 miles in 1876, 518 miles in 1875, 727 miles in 1874 and 696 miles in 1873.

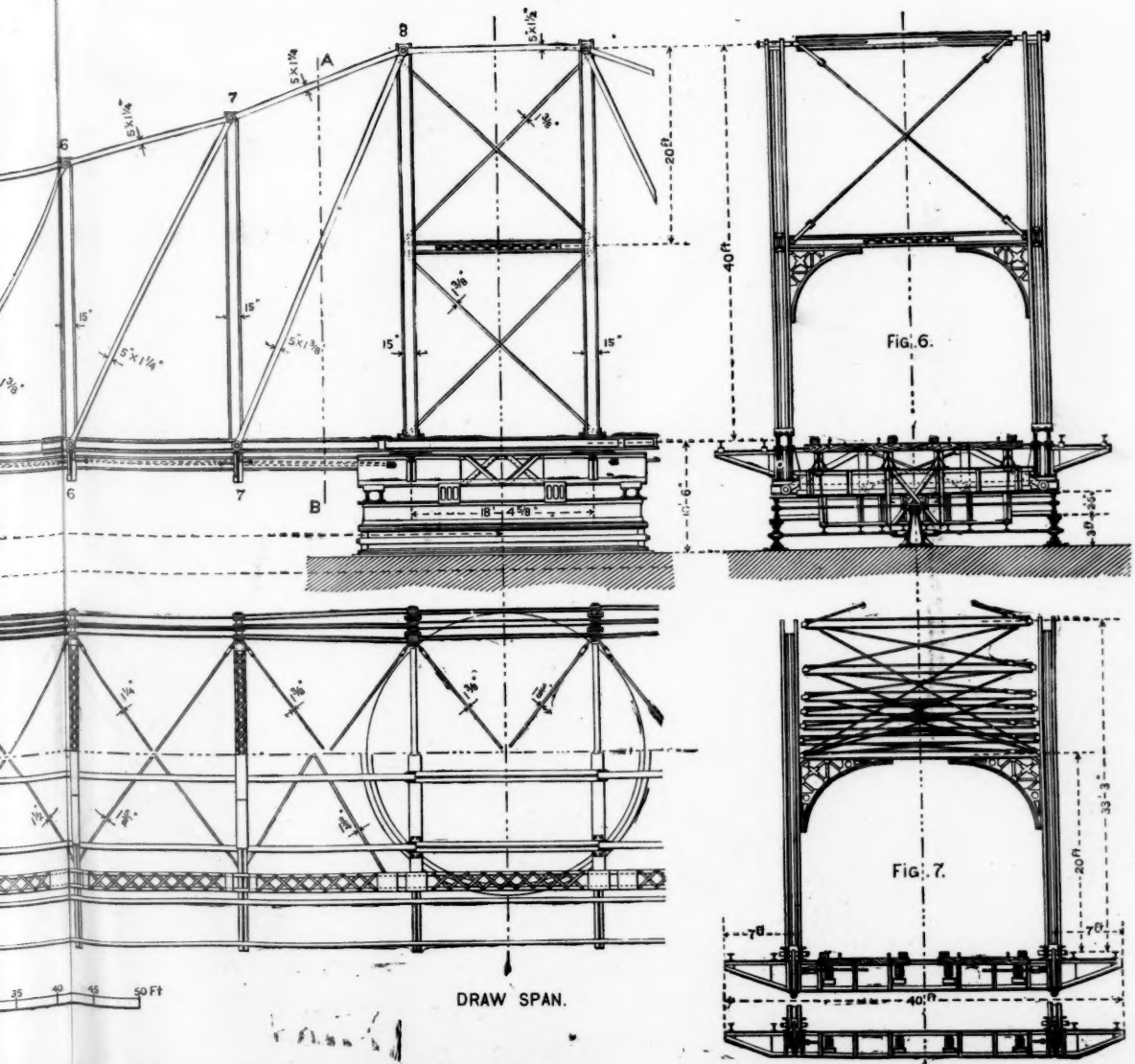
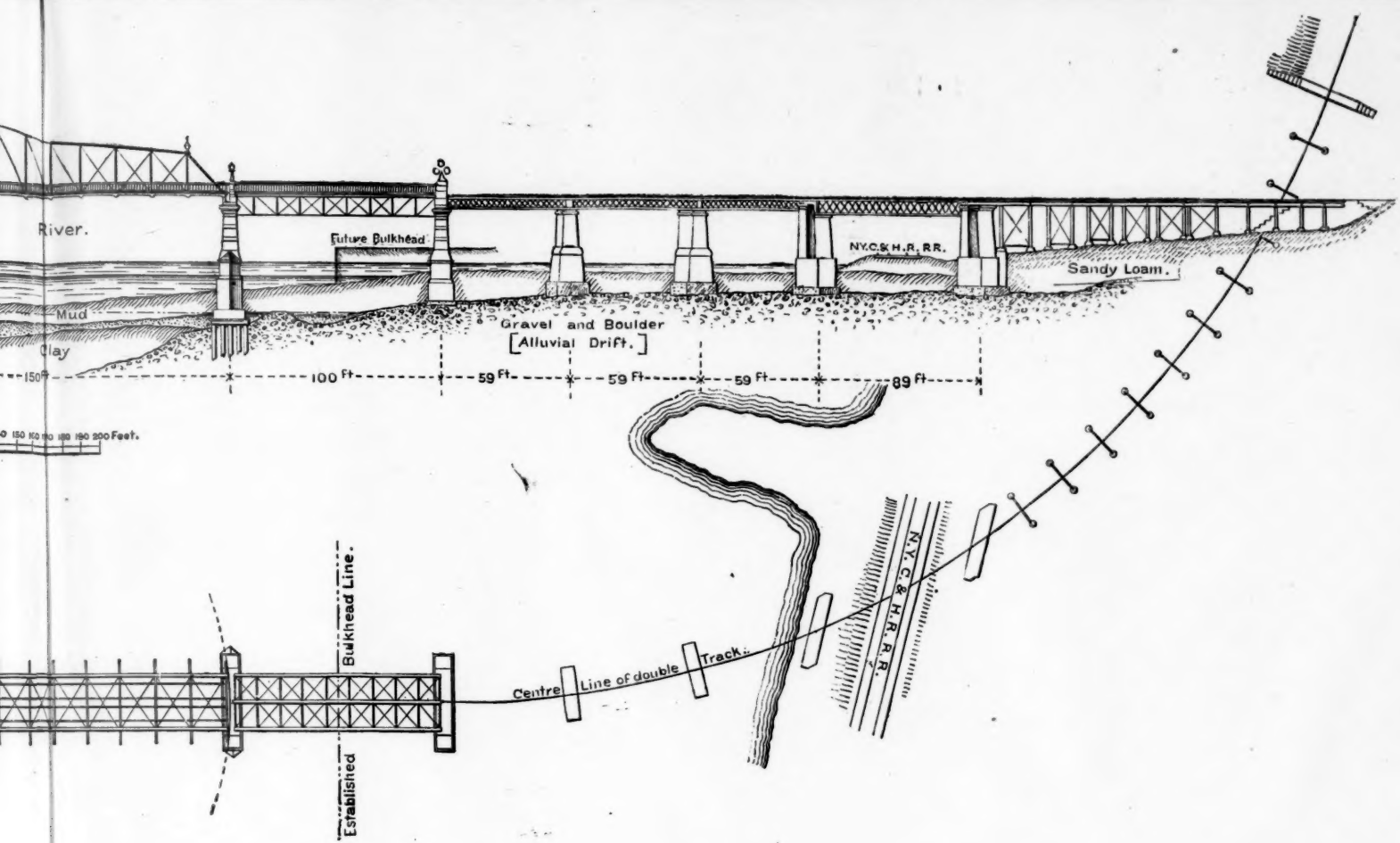
THE CENTRAL VERMONT CASE has reached a new stage in the decision of the Vermont Supreme Court in the Langdon suit, which virtually reverses the decision of the same Court made five years ago. The decision of 1877 was, in brief, that the so-called perpetual receivership of 1864 was in no sense a legal receivership; that the trustees and managers then appointed, and the Central Vermont Company as their successor, were simply managers by consent and not officers of the Court, and that the debts incurred by them could not be made prior to the bondholders' claims unless it could be clearly shown that they were necessarily incurred in operating the roads, or contracted with the full consent of all the parties in interest. The present decision, on the other hand, establishes the long receivership as a legal trust, and holds that the consent of the parties in interest must be taken as granted. It further holds the whole body of the trust debt (with a few exceptions into which further inquiry is to be made) to be a lien "in the nature of an equitable mortgage," prior to that of the original owners, the Vermont Central Company and its bondholders, and the Vermont & Canada stockholders. Still further, it directs that the amount of this trust debt be ascertained in the usual way, and that, if the original owners fail to redeem their property by paying the claims which may be audited by the Court, they shall be foreclosed of all their title and interest in the property, and obliged to turn it over to the trust creditors.

As the trust debt is fully equal to the present value of the Vermont Central and the Vermont and Canada roads, this decision virtually turns over the roads to the creditors of the



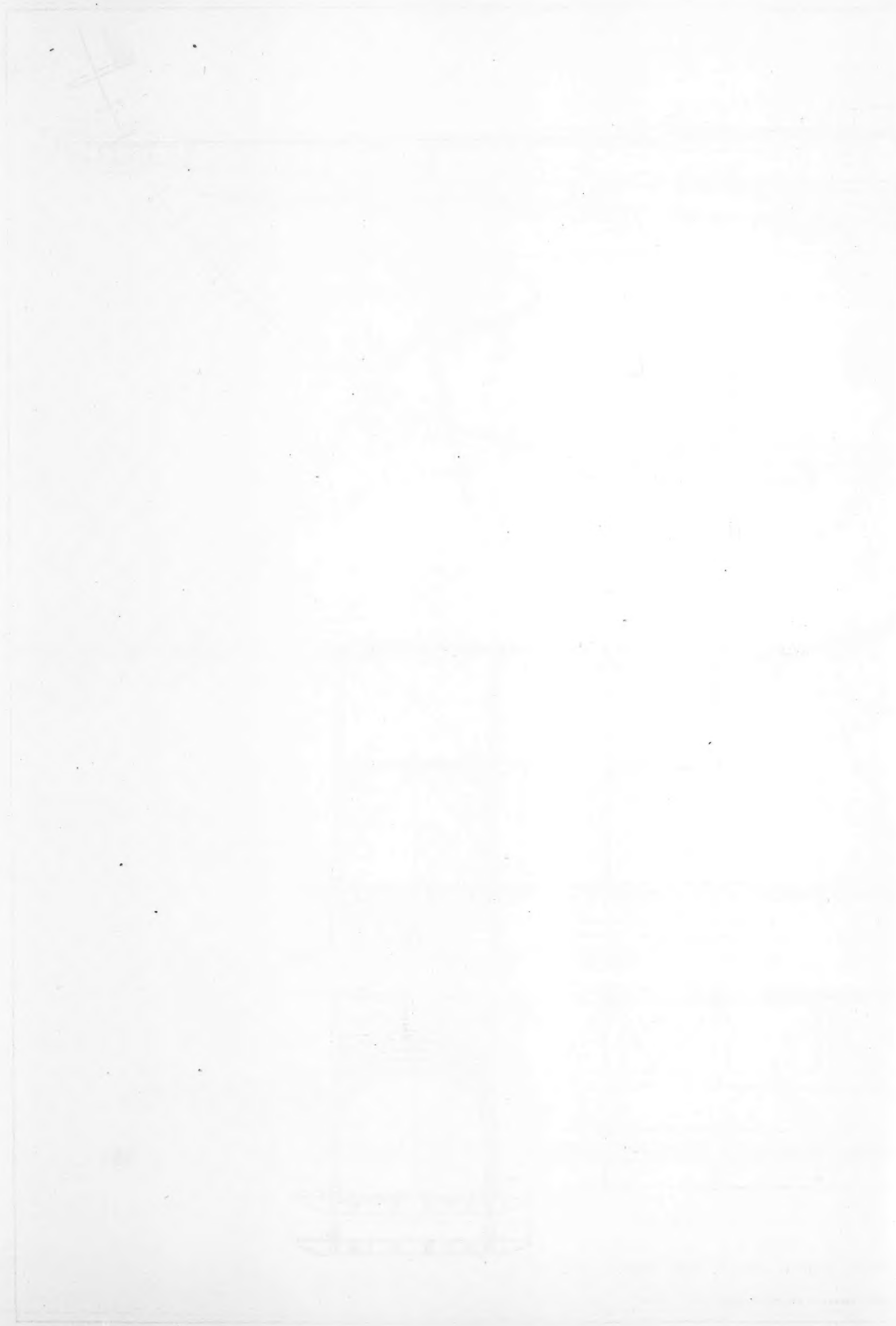
THE HARLEM-RIVER BRIDGE [WEST-SIDE & YONKERS RAILW

ALFRED P. BOLLER, *Chief Engineer*; CLARKE, REEVES & CO., AND



NEW YORK CENTRAL HARBOR RAILWAY] AT EIGHTH AVENUE, NEW YORK.

EVES & CO., AND SMITH, RIPLEY & CO., Contractors.



trust, and wipes out the interest of the original owners. The Vermont Central bonds and the Vermont and Canada stock are held by many persons, and it is not at all likely that the money needed to redeem the roads could be raised from a number of scattered owners, many of whom would probably be unable to contribute, while others would certainly be unwilling to throw good money after bad, as a matter of policy, even if they did not resent the injustice which they believe has been done them.

It is, we suppose, now a settled point of law that when a receivership exists, the necessary expenditures of the receiver for the care and preservation of the property and the operation of the road are considered a lien superior to the claims of bondholders and stockholders. But it is a matter of public notoriety that a very large portion of the Vermont Central trust debt was incurred, not in simply working the road and keeping it in order, but in operations of the trustees and managers, which were really outside of and foreign to the purposes of the trust. It is very much as if, supposing the New York Central to be in the hands of a receiver after failure to pay the interest on its own bonds and the rent of the Harlem road, the receiver should proceed to lease the Erie, the Canada Southern and the Grand Trunk at exorbitant rentals, and to make unprofitable traffic contracts with the Lake Shore and the Michigan Central, and should then, to make up the losses from these improvident speculations, borrow money on the security of the roads under his receivership, and claim that the debts so incurred were prior liens to all the claims which the New York Central bondholders and the Harlem stockholders might have.

We cannot, of course, question the law or the motives of the Court in this decision, but to an outsider, looking at the case from an equitable point of view, it does seem that a serious injustice has been done, under cover of the forms and protection of the law.

THE NEW YORK CANAL REVENUES now seem likely to be much less than last year even, and less than the amount that will be needed to maintain the canals properly next year. The constitutional limitation of the expenditures of one season to the amount of the tolls the previous season is truly an absurd one, but the popular remedy for it, namely, giving up all the revenues of the canals and maintaining them at the public expense, is an extreme course which it is hard to justify on economical principles or justice to the taxpayers. It will amount to the state paying a bounty of a cent a bushel or more to the canal boats for carrying grain through the canal, which is a good thing for certain branches of business at the cities of New York and Buffalo, and of scarcely any advantage to other parts of the state. The traffic which profits by the canal should pay the cost of maintaining it: nothing can be more equitable than that; because in unfavorable years it cannot be no reason for abandoning the canal, it is true, for its value is determined by its average effect; but because the boats in some years cannot pay the cost of maintenance is certainly not a reason why they should never pay anything. Last year the canal suffered because the railroads were carrying for less than cost, and though there was a fair traffic in the freights which the canal usually carries, taking the season as a whole, the boats could not afford to take it. Neither could they if they had had no tolls to pay. This year the railroad rates are not in the way and the season opened unusually early, but there is little grain for anyone to carry, and grain has been the chief canal freight. With the number of railroads doubled that carry between New York and Buffalo, we fear that next year also the canal boats will find it hard to get grain. The new roads do not control any railroad connections west of Buffalo, which will make it the more important for them to have lake connections, and we may be sure that they will each have a fleet running in connection with them as soon as they are opened, and that they will carry coal and grain at canal rates if they cannot get full employment for their equipment on other freight at higher rates. Then the Welland Canal will compete more effectively than heretofore, as, indeed, it is doing already. One day last week, out of five vessels chartered for grain at Chicago, four were to go through the Welland Canal. There is no doubt that the Erie Canal is in a bad way, and under the law as it stands would soon have to be abandoned; but this hardly seems to justify paying a bounty for the sake of having transportation done by it when it can be done otherwise to greater advantage.

CHICAGO LUMBER RECEIPTS for the six months ending with June last were:

	1882.	1881.	Increase.	P. c.
Lumber, ft.....	723,923,000	597,857,000	124,066,000	24.1
Shingles, No.....	341,453,000	241,802,000	99,651,000	41.2

The lakes were not open until near the first of May last year, but were steadily from some time in March this year, and at various times in earlier months, but this alone will hardly account for the great increase in receipts. There has been a great increase in the stocks on hand, in comparison with July 1 last year, amounting to nearly 91,000,000 ft. of lumber. But for the half-year, sales and shipments, which represent the demand pretty accurately, have increased greatly also. For the half-year they have been:

	1882.	1881.	Increase.	P. c.
Lumber, ft.....	839,300,296	743,306,344	95,993,952	12.9
Shingles, No.....	378,519,994	287,798,000	90,721,994	31.3

Latterly shipments had been falling off, but since the certainty of a heavy winter wheat crop there is a revival of the demand. During the month of June receipts were so much in excess of sales that there was an increase of 70,328,000 ft. in the stock of lumber, and of 56,381,000 in the shingles.

The market gave way under this unfavorable showing, but there has been better business since.

Shipments from the Saginaw lumber districts in the first half of the year for three years have been:

	1880.	1881.	1882.
Lumber, ft.....	273,408,904	224,947,306	284,794,932

The Saginaw production finds its market chiefly east and south of Michigan.

The stock of lumber on hand at points on the Mississippi River and its tributaries (St. Louis and north), July, for four successive years, and also at Lake Michigan points and Eastern Michigan points, has been, in feet, according to the Northwestern Lumberman:

	1879.	1880.	1881.	1882.
M. River.....	378,768,000	566,238,202	684,617,963	809,988,000
L. Mich.....	480,107,633	583,546,419	585,741,329	620,900,000
E. Mich. & Lake Erie.....	375,550,000	413,087,000	455,300,000	518,840,000
G. Bay.....	25,000,000	44,000,000	42,000,000	38,000,000

Total.....1,259,425,633 1,607,461,621 1,747,659,292 1,987,738,000

The large increase of 240,000 ft. (13½ per cent.) in the stocks on hand at the close of a bad crop-year was likely to affect prices, as an increase over the very heavy demand of last year is required to dispose of it.

CROP PROSPECTS remain good for spring wheat, the condition seeming to improve. Winter wheat is now mostly harvested, except in Michigan, and is a magnificent crop—perhaps as great as that of 1880, though the acreage was a little less. There has been favorable weather for corn lately, but it is not likely that any weather can make a good crop now in the greater part of Illinois, Indiana and Iowa. Further north, where more corn than heretofore has been planted, the chief drawback is the lateness of the crop, and in the states just named it is late as well as poor, so that the risk of damage by frost is much greater than usual. Rains in Texas have come in time to prevent great destruction of corn by drought there, and however Illinois and adjacent states may fare we are almost sure to have more than the 1,195,000,000 bushels of corn raised last year in the United States, and less than 1,717,000,000 bushels raised in 1880. The heavy winter-wheat crop and the prospect for a heavy spring-wheat crop have led many, and stock speculators especially, to look on the season as an extraordinarily favorable one, likely to cause as much activity in carrying produce as the crops of 1879 or 1880. Of this there is no prospect. Our largest wheat crop was 498,500,000 bushels, and this may perhaps be equaled this year; but our largest corn crop was 1,773,000,000 bushels (in 1879), and we will be fortunate if we have 1,500,000,000 bushels this year, and this decrease will be felt. Moreover, there is probably 7 per cent. more people and 11 per cent. more railroad now than in 1880, and 10 per cent. more people and 20 per cent. more railroad than in 1879; and to cause equal prosperity we should have not the 2,232,000,000 bushels of wheat and corn produced in 1879 or the 2,215,000,000 produced in 1880, but a considerably larger amount.

Still the crops are a vast improvement over those of 1881, and will probably be, taking them all together, average crops, in spite of less than an average yield of corn and perhaps of cotton. But in 1877, 1878, 1879 and 1880 the grain crops, and in most of these years the cotton crops, were above the average in yield per acre, and this perhaps leads us to expect too much of them.

THE DINING CAR IN ENGLAND made its first trip July 7, and it is announced that one of the Midland trains between London and Liverpool will have one hereafter, enabling the passenger leaving London at 5 o'clock and Liverpool about 4 o'clock in the afternoon to take his dinner in peace and at his leisure. The cars are Pullman cars, but they seem to be managed not like the Pullman hotel cars here, which are restaurants, but like the dining cars which have been so generally introduced by railroad companies directly in this country within the past few years, and are now running on the Pennsylvania's New York & Chicago limited express, on the Baltimore & Ohio, the Michigan Central, the Grand Trunk, and on many of the roads from Chicago to the West. That is, on the Midland train a table d'hôte dinner is served in the Pullman dining-car at the fixed price of 3s. 6d.

The English newspapers speak very favorably of the innovation, which is doubtless a great improvement over the 20 minutes' halt at an eating-house, where selection and mastication, not to say satisfaction, are impossible to a civilized eater.

THE CHESAPEAKE, OHIO & SOUTHWESTERN RAILROAD now has its track all laid between Paducah and Memphis, which gives the Chesapeake & Ohio a through line from the mouth of the Chesapeake at Newport News to the Mississippi at Memphis, a distance of 927 miles, with connections to Cincinnati and Louisville, forming a true trunk line, the first south of the Ohio River, lying between the Baltimore & Ohio on the north and the Norfolk & Western on the south. Newport News is not New York, to be sure, nor even Baltimore, but Norfolk (which is to Newport News as New York to Jersey City), is already a great cotton shipping point, and the new road will compete for cotton at Memphis, and for tobacco in Kentucky, and will make great efforts to secure grain in the Ohio Valley for export from Newport News or Norfolk, or to forward thence to more northern ports. It will also be felt, doubtless, as a competitor for New York merchandise consigned to Louisville, Cincinnati and St. Louis, as well as to Memphis and other Southern places. The heavy wheat crop in the Ohio Valley this year gives it an unusually good opportunity to

test the practicability of exports by the mouth of the Chesapeake, and before this crop is all marketed the road will probably be better known as a grain-carrier than it has been hitherto.

PROVISION EXPORTS show a decrease in the month of June and the half-year then ending which is small in comparison with the decrease in grain exports, but is still considerable, amounting to 23½ per cent. (in value) for June and 40 per cent. for the half-year. There was a great decrease in June last year, owing to the restriction on the imports of American pork in France. The decrease recently has been less in hog products than in fresh beef, tallow and dairy products. In the latter it was more than 40 per cent. in May and June, in spite of higher prices. The short corn crop accounts for the smaller exports of hog products, though an increase in the home consumption will have to be charged with part of it; and the stock of hogs has been so decreased that we may not expect to rise to the old figures for a long time to come. But the season has been favorable for the dairy—grass coming early, and being abundant ever since. The reduction in butter and cheese exports, therefore, is probably due to larger home consumption. The increase in our population recently has been felt more in larger consumption than in larger production of agricultural produce.

CHICAGO RAIL SHIPMENTS EASTWARD for the week ending July 8 were 21,765 tons, against 56,167 tons in the corresponding week of last year, and 34,223 tons in the corresponding week of 1880. The receipts this year are 10 per cent. less than the previous week (sufficiently explained by the holiday) and were the smallest that have ever been reported since the accounts have been kept, about four years. Of the total, 11.8 per cent. went by the Chicago & Grand Trunk, 19.1 by the Michigan Central, 20.3 by the Lake Shore, 29.2 by the Fort Wayne, 11.1 by the Pan-Handle, and 8.5 by the Baltimore & Ohio—39.4 by the two Vanderbilt roads, and 40.3 by the two Pennsylvania roads.

The shipments of freight billed from Chicago (not including shipments from the west billed through Chicago) for the week ending July 15 were 15,731 tons, against 50,832 tons in the corresponding week of last year, and 13,231 tons in the previous week of this year. The decrease in provisions was but 9 per cent., but in grain it was 80 per cent., and in flour 90 per cent.

The Harlem River Bridge, Westside & Yonkers Railway.

The engravings this week show the location and some of the details of construction of this bridge, of which a perspective view was published in our issue of June 23.

Fig. 2 is an elevation and fig. 3 a plan, the latter showing on the left the connection with elevated railroad on Eighth avenue. Fig. 2 shows the general arrangement of the different spans and piers and the character of the foundation of the latter.

Figs. 4, 5, 6 and 7 are engravings of the large draw-span. No description of these illustrations is needed. Next week some of the details of construction will be given.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows: Cincinnati, Hamilton & Dayton, special meeting, in Cincinnati, Aug. 18, to vote on the question of issuing \$1,000,000 preferred stock.

The Grand Trunk and the Great Western companies will hold special meetings in London, England, Aug. 10, to vote on the agreement of consolidation. These meetings are held because of a possible legal informality in the notices for the special meetings recently held, at which the agreement was approved.

Dividends.

Dividends have been declared as follows: Middletown, Unionville & Water Gap (leased to New York, Susquehanna & Western), 3½ per cent., semi-annual, payable July 15. Atchison, Topeka & Santa Fe, 1½ per cent., quarterly, payable Aug. 15. Transfer books closed July 15.

Foreclosure Sales.

The Indianapolis & St. Louis road will be sold in Indianapolis, July 27, under the decree of foreclosure lately granted by the United States Circuit Court. The road extends from Indianapolis to Terre Haute, 71.3 miles, and has a bonded debt of \$3,500,000.

Master Car-Painters' Association.

The following circular has been issued by Mr. D. D. Robertson, President of this Association:

"The thirteenth annual convention of the Master Car-Painters' Association of the United States and Canada will be held in Chicago, commencing on Wednesday, Sept. 20.

"The increasing interest in the Association has been very marked, and the object sought to be attained has been more fully accomplished during the past few years. The committee are now busy making the necessary arrangements, which, when completed, will be duly announced, and everything will be done to make the coming convention one of profit. Care has been taken in the selection of subjects for discussion, that they may be thoroughly practical, and in many cases touching difficulties which are of every-day's occurrence in the paint shop. In addition to the subjects chosen, some portion of our time will be devoted to 'Plain Talk on General Topics,' giving an opportunity for any one to get the benefit of practical experience on any department of car painting on which he may desire information; any question or topic you may wish discussed, by forwarding the same to the Secretary, Mr. R. McKeon, New York, Pennsylvania & Ohio Railroad, Kent, Ohio, it will come under this head and receive due consideration.

"I would urge upon all master car-painters to endeavor to be present and take part in the convention. The meetings in the past have been of immense benefit, and nothing

will be left undone to make the future still more interesting and instructive:

"The Secretary's circular will be issued at an early date, announcing the subjects for consideration and also the headquarters for meetings."

Baltimore & Ohio Relief Association.

The statement of the workings of this Association for the month of June has just been issued by Mr. W. T. Barnard, Secretary, and shows that 605 benefits were paid during the month to members suffering from injury or disease, the payments being mostly small amounts. There were two deaths of members in the machinery department, viz: John T. Cook, of congestion of the brain, and Isaac Kelly, of pneumonia. The family of the former received \$400 and of the latter \$600. The new savings fund and building features of the Association will be put into active operation Aug. 1.

ELECTIONS AND APPOINTMENTS.

Associated Railroads of Virginia and the Carolinas.—Mr. Sol. Haas is appointed Traffic Manager, a new office. He has been General Freight Agent of the Associated Railroads since their traffic departments were united, and was previously General Freight Agent of the Richmond & Danville.

There will be a general freight agent and a general passenger agent under Mr. Haas, but those officers have not yet been appointed.

The roads under the Traffic Manager will be the Seaboard & Roanoke; Raleigh & Gaston; Raleigh & Augusta Air-Line; Carolina Central; Richmond & Petersburg; Petersburg, Wilmington & Weldon; Wilmington, Columbia & Augusta; Northeastern (South Carolina); South Carolina Central; Cheraw & Darlington; Cheraw & Salisbury; Richmond & Danville; Virginia Midland; North Carolina; Western North Carolina; Atlanta & Charlotte Air Line; Charlotte, Columbia & Augusta; Greenville & Columbia; Northeastern of Georgia; Elberton Air-Line.

Atchison & Southwestern.—The directors of this new company are: P. Kehn, E. R. Purcell, F. D. Mills, H. Low, J. P. Pomeroy, C. C. Burns, J. P. Brown, J. H. Beeson. Office in Atchison, Kan.

Blue River.—The directors of this new company are: F. D. Mills, J. H. Beeson, H. Low, F. Schwerdt, J. W. McPherson, L. R. Elliot, E. B. Purcell. Office in Atchison, Kan.

Burlington, Cedar Rapids & Northern.—Mr. Louis A. Bein is appointed Master of Transportation of the entire line.

Mr. W. B. Craw is appointed Train-Master of the First, the Muscatine and the Iowa City divisions; Mr. C. D. Ives, Train-Master of the Second, the Third and the Milwaukee divisions.

Chicago & Iowa.—Mr. Thomas J. Potter has been appointed General Manager; J. C. Peasley, Treasurer; W. H. Holcomb, General Superintendent. Messrs. Potter and Peasley are officers of the Chicago, Burlington & Quincy, which now controls the road.

Chicago Suburban.—The directors of this new company are: Leslie Carter, Ernest Carter, T. W. Wadsworth, Edwin Walker, Chicago; Alexander Mitchell, S. S. Merrill, John W. Cary, Milwaukee. It is controlled by the Chicago, Milwaukee & St. Paul.

Chicago & West Michigan.—Mr. N. B. Rogers has been appointed Auditor in place of Hugh Park. Mr. Park continues to be Purchasing Agent.

Cincinnati, Indianapolis, St. Louis & Chicago.—Mr. M. H. Cook has been appointed Superintendent of Telegraph and Chief Train Dispatcher.

Cincinnati, New Orleans & Texas Pacific.—Mr. R. S. Pomeroy, Auditor, having resigned, the office is abolished and its duties transferred to the Comptroller.

East Tennessee, Virginia & Georgia.—Mr. W. V. McCracken is appointed Superintendent of the Georgia Division, which will include the line from Ooltewah Junction, by Dalton, Rome, Atlanta and Macon to Brunswick. His office will be at Atlanta, Ga. Mr. J. E. Mallory, will be Assistant Superintendent at Macon, and Mr. M. N. Beatty, Assistant Superintendent at Atlanta. Mr. McCracken has had charge of the construction of the new line from Rome to Macon.

Gulf, Colorado & Santa Fe.—Mr. B. W. Walker is appointed Assistant General Freight Agent, with office in Galveston, Tex.

Mr. M. Miller is appointed Traveling Passenger Agent.

Illinois Central.—Mr. Charles Hurd is appointed Superintendent of Suburban Traffic, a new office. He has been for a number of years a conductor on the road.

Little Rock, Mississippi River & Texas.—Mr. A. N. Stafford has been appointed Auditor, and Mr. R. D. Lewis, General Freight and Passenger Agent, with offices at Little Rock, Ark.

Louisville, Charleston & Peoria.—This company has elected A. J. Fryer, President; T. M. Sallee, Vice-President; J. K. Rardin, Secretary; A. C. Burgner, Treasurer. Offices in Charleston, Ill.

Louisville, Evansville & St. Louis.—Mr. James S. Clark has been appointed General Agent at Evansville.

Massachusetts Central.—The board has elected S. N. Aldrich, of Marlboro, Mass., President in place of Hon. George S. Boutwell, resigned.

Messrs. Lyman Hollingsworth, Charles R. McLean and M. Pickering have been chosen directors in place of Silas Seymour, James Rollins and Luke Lyman, resigned.

Milwaukee & Northern.—The following appointments will take effect Aug. 1: J. J. Coleman, General Freight Agent; R. Toombs, Auditor; E. P. Regan, General Ticket Agent.

Missouri Pacific.—Mr. L. Pearson having resigned the division agency of this company at Sedalia, Mo., Mr. J. F. Barrett is appointed to that office, taking effect July 11.

Mobile & Girard.—At the annual meeting recently the following were chosen: President, Wm. M. Wadley; directors, N. P. Banks, N. N. Curtis, C. S. Lee, F. H. Mitchell, J. D. Murphree, John Peabody; Secretary and Treasurer, J. M. Frazer; Superintendent, W. L. Clark.

Nevada & Oregon.—At a meeting of the board in Reno, Nev., July 17, the following officers were chosen: President, D. W. Balch, of Nevada; Vice-President, Frank F. Fowler, New York; Secretary, George A. King, of Nevada; Treasurer, A. H. Manning, of Nevada.

New York & New England.—Mr. S. Jackson has been appointed Secretary to General Manager S. M. Felton, Jr. Mr. Jackson was recently on the Pennsylvania Railroad, at Altoona.

New York, Ontario & Western.—Mr. Isaac W. Fowler has been appointed Purchasing Agent and Paymaster of this company, in place of Charles Clark, resigned, to take effect July 20. All communications relating to business in these departments will be addressed to him at Middletown, N. Y., on and after July 19.

New York, West Shore & Buffalo.—The general offices of this company are now at No. 15 Broad street (Mills Building), New York city.

North Carolina.—At the annual meeting in Raleigh, N. C., July 13, the following were announced as state directors for the ensuing year: R. F. Hoke, Donald MacRae, R. W. Thomas, Kerr Craig, J. L. Morehead, Wm. S. Roulhac, Armistead Burwell, W. F. Kornegay.

The stockholders then elected the following directors on their part: H. W. Fries, M. L. Holmes, R. B. Haywood, Thomas M. Holt.

The board subsequently re-elected Thomas M. Holt, President; Peter B. Ruffin, Secretary and Treasurer. The road is leased to the Richmond & Danville Company.

Northern, Northwestern & Sault Ste. Marie.—At the annual meeting in Toronto, Ont., July 4, the following directors were chosen: Adam Brown, Wm. Ince, N. Barnhart, W. B. Scarth, A. R. Boswell, A. Morris, John Fisk, A. McInnes, Wm. Hendrie, Dalton McCarthy, W. E. O'Brien, J. Proctor. The board elected Adam Brown, President; Wm. Ince, Vice-President.

Ontario Southern.—Mr. S. B. Stuart is appointed Superintendent in place of E. R. Mills, resigned.

Pennsylvania.—Mr. John N. Belford is appointed Train-Master of the Middle Division of the Philadelphia & Erie Railroad Division, in place of W. H. Ginter, transferred. Mr. E. D. Gardner, in addition to his duties as Division Operator, will act as Assistant Train Master. Mr. Josiah McManigal has been appointed Dispatcher Renovo Yard, vice J. N. Belford promoted. To date from July 1.

Pennsylvania & Martin's Creek.—At the annual meeting July 18 the following officers were chosen: John Brown, President; Thomas L. McKeen, Vice-President; George C. Moon, Secretary; Wm. Hackett, Jr., Treasurer.

Savannah & Tybee.—The officers of this new company are: President, J. W. Pinder; directors, B. P. Ives, W. L. Jackson, George Newton, A. K. Paul; Secretary and Treasurer, W. L. Jackson. Office in Savannah, Ga.

PERSONAL.

—Mr. E. R. Mills has resigned his position as Superintendent of the Ontario Southern road.

—Mr. J. T. Odell, General Superintendent of the Chicago, Texas & Mexican Central road, has resigned his position.

—Hon. George S. Boutwell has resigned his position as President of the Massachusetts Central Railroad Company.

—Mr. R. S. Pomeroy has resigned his position as Auditor of the Cincinnati, New Orleans and Texas Pacific Company.

—Mr. H. G. Allis, Auditor and General Freight and Passenger Agent of the Little Rock, Mississippi River & Texas road, has resigned his position.

—It is stated that Mr. R. S. Veech, President of the Louisville, New Albany & Chicago Company, has tendered his resignation. It has not yet been accepted.

—Mr. Adolphus Davis, recently appointed General Manager of the North Shore Railway (of Canada), has been for some time Master Mechanic of the road, having had charge of the rolling stock ever since the road was first opened by the government of Quebec.

—Mr. Abram B. Baylis, one of the oldest and best known brokers on Wall street, died July 15, at his residence in Brooklyn, N. Y., aged 71 years. He had been a member of the New York Stock Exchange since 1841, and had been on the street for several years previously as a clerk. A little over a year ago he retired from active business. Mr. Baylis was largely interested in railroad property, and at different times had been a director in the New York & Harlem, the Chicago & Northwestern, the Wabash and other companies.

—Hon. Joseph E. Brown, United States Senator from Georgia and President of the Western & Atlantic Railroad Company, has given the State University of Georgia \$50,000 as a fund to be used in assisting poor students in the University at Athens and the Agricultural College at Dalton. The interest of the fund is to be loaned annually to students who are too poor to support themselves while studying, with the understanding that they are to repay the loans whenever they are able to do so; all sums so repaid to be added to the principal. Senator Brown gives this fund as a memorial of his son, who died about a year ago, while a student in the University.

TRAFFIC AND EARNINGS.

Grain Movement.

For the week ending July 8 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels:

Year.	Northwestern receipts.		By rail.		P. c. by rail.		Atlantic receipts.
	1877.	1878.	1877.	1878.	1877.	1878.	
1877	2,550,086	3,341,924	689,103	20.0	2,229,164		
1878	3,118,902	2,967,635	922,031	31.1	2,967,445		
1879	4,250,273	4,135,059	1,440,081	34.9	3,983,935		
1880	4,590,527	6,375,678	1,605,869	25.2	8,137,107		
1881	5,256,827	6,261,411	2,203,463	35.2	6,834,152		
1882	1,886,422	1,932,349	815,201	42.2	2,018,048		

Of the Northwestern receipts this year Chicago had 40.7 per cent., St. Louis 26.3, Milwaukee 10.4, Peoria 9.5, Toledo 6.3, Detroit 3.4, Cleveland 2.9 and Duluth 0.5 per cent.

Of the Atlantic receipts New York had 60.1 per cent., Montreal 12.8, Boston 11.1, Baltimore 8.2, Philadelphia 3.9, New Orleans 3.4 and Portland 0.5 per cent.

There is some increase in the Northwestern wheat receipts, chiefly at St. Louis, which is probably due to the marketing of new winter wheat.

Exports for the week ending July 12 are larger than for a long time previous, namely, 1,514,595 bushels of grain and 68,018 barrels of flour, against 4,141,783 bushels of grain and 82,019 barrels of flour in the corresponding week of last year.

San Francisco wheat exports for the California crop year ending June 30 were as follows, wheat in bushels and flour in barrels, flour being reduced to wheat in the totals:

	1881-82.	1880-81.	Increase.	P. c.
Flour	860,850	660,703	200,047	30.3
Wheat	37,132,575	22,300,537	14,832,038	66.4
Total, bushels	41,436,825	25,613,352	15,823,473	61.8

The wheat exports last year were the largest ever made, and are nearly double those of any year previous to 1880-81.

Nearly half of these exports, however, were of the crop of 1880, left over until after the harvest of 1881.

Exports of California barley by sea for the crop year were 98,064 centals, a decrease of 393,649 centals or 80.8 per cent. from the previous year. Shipments overland for eleven months to May 31 were 154,620 centals.

Shipments of wheat by sea from Oregon ports for the crop year were 6,173,335 bushels.

Railroad Earnings.

Earnings for various periods are reported as follows:

Six months ending June 30:		1882.	1881.	Inc. or Dec.	P. c.
Buff. Pitts. & West.	\$383,063	\$297,004	I.	\$86,059	29.0
Cairo & St. Louis.	170,018	207,298	D.	37,280	18.0
Ches. & Ohio.	1,388,490	1,296,123	I.	92,367	7.1
Houston, E. & W. Tex.	122,323	66,010	I.	56,313	85.3
Kan. C., Ft. Scott & G.	761,731	687,888	I.	73,843	10.7
Lake Erie & Western.	657,780	625,589	I.	32,191	5.1
Oregon Ry. & Nav. Co.	2,240,500	1,766,288	I.	474,212	26.8
Net earnings.	997,670	760,800	I.	236,870	31.1
Five months ending May 31:					
Bur. Cedar Rap. & No.	\$1,080,142	\$791,120	I.	\$289,022	36.5
Net earnings.	94,555	176,576	I.	177,369	100.1
Ches. & Ohio.	1,127,737	1,054,988	I.	72,749	6.9
Net earnings.	253,819	122,357	I.	131,462	107.7
Des M. & Ft. Dodge.	150,679	123,206	I.	27,473	22.3
Net earnings.	59,139	9,501	I.	49,638	522.5
Utah Central.	643,304				
Net earnings.	393,246				
Month of April:					
Evansv. & T. H.	\$65,272	\$56,480	I.	\$8,792	15.7
Net earnings.	31,382	* 2,428			
Month of May:					
N. Y. & N. England	\$289,722	\$217,186	I.	\$72,536	33.4
Net earnings.	94,555	56,492	I.	38,063	67.8
Utah Central.	152,323				
Net earnings.	100,935				
Month of June:					
Buff. Pitts. & West.	\$75,100	\$53,100	I.	\$22,000	41.1
Cairo & St. Louis.	26,021	33,551	D.	7,530	22.4
Ches. & Ohio.	260,753	241,135	I.	19,618	8.1
Houston, E. & W. Tex.	23,344	13,873	I.	9,531	69.1
Kan. City, Ft. S. & G.	103,500	110,753	D.	7,193	6.5
Lake Erie & Western.	131,160	127,996	I.	3,173	2.5
Oregon & Cal.	72,400				
Net earnings.	32,500				
Oregon Ry. & Nav. Co.	395,900	374,995	I.	20,905	5.6
Net earnings.	188,900	181,505	I.	7,395	4.1
First week in July:					
Chi. & Eastern Ill.	\$29,204	\$31,286	D.	\$2,082	6.7
Chi. & Gd. Trk.	32,973	20,947	I.	12,026	57.5
Second week in July:					
Denver & R. G.	\$111,638	\$131,920	D.	\$20,282	14.4
Northern-Pacific.	151,700	91,760	I.	59,940	65.3

*Deficit.

Coal Movement.

The coal tonnages reported for the week ending July 8 are as follows:

	1882.	1881.	Inc. or Dec.	P. c.
Anthracite.	491,434	353,307	I. 138,037	39.0
Semi-bituminous.....	29,592	91,558	D. 61,966	67.3
Bituminous.....	56,158	31,923	I. 24,235	75.7
Coke.....	43,063	35,635	I. 7,428	20.9

Semi-bituminous shipments are the smallest reported for a long time, which is the result of the strikes in the Cumberland and Clearfield regions.

The coal tonnage of the Pennsylvania Railroad for the week ending July 8 was: Coal, 103,125; coke, 43,063; total, 146,188 tons. The week included a general holiday. The total tonnage this year to July 8 was 5,667,349 tons.

Chicago coal receipts for the two months from May 1 to June 30 were as follows:

	—Anthracite.—		—Bituminous.—	
	1882.	1881.	1882.	1881.
By lake.....	154,042	144,735	37,919	74,791
By rail.....	46,003	38,802	325,769	364,323
Total.....	200,045	183,537	373,688	439,114

The increase in anthracite was 16,508 tons, or 9.0 per cent.; the decrease in bituminous was 65,426 tons, or 14.9 per cent. The total receipts this year were 573,733 tons, a decrease of 48,918 tons, or 7.8 per cent.

Mr. John B. Jones, Official Accountant, furnishes the following statement of the general distribution of anthracite coal in the year 1881, in tons of 2,240 pounds:

	1881.
Competitive—Including tonnage passing out of Cape of Delaware; to New York harbor; to points on Hudson River, Long Island Sound and Atlantic Coast, north of Port Judith.	12,169,030
Western—Including tonnage to United States points west of Buffalo and the Detroit River, Erie, Pittsburgh and Baltimore.	2,079,134
Canadian—Including all tonnage by lakes and rail to points in Dominion of Canada.	694,428
Southern—Estimated tonnage to all points in Delaware, Maryland, and the territory bounded by the Ohio and Mississippi River on the north and west, and the Gulf of Mexico on the south.	800,000
Pacific Coast.	15,000
Local—Embracing all coal consumed in Pennsylvania, New York and New Jersey.	12,742,424
Total production in 1881.	28,500,016

The Official Accountant's statement of the tonnage of anthracite coal for June and the half-year ending June 30, differing somewhat in form from the weekly statements, is as follows:

	June.	1881.	1882.	1881.
Phila. & Reading.	586,467	586,913	2,906,074	2,925,087
Lehigh Valley.	560,805	454,404	2,619,692	2,498,403
Central of N. J.	440,847	390,040	1,888,373	1,831,410
Delaware, Lacka. & Western.	428,057	368,352	2,019,258	1,948,848
Delaware & Hudson Canal Co.	270,600	239,890	1,365,371	1,416,239
Pennsylvania R. R. Co.	220,216	210,250	1,056,800	1,033,924
Pennsylvania Coal Co.	132,831	127,132	604,880	591,578
N. Y., Lake Erie & Western.	21,156	42,149	106,804	222,008
Total.	2,625,039	2,418,239	12,567,852	12,467,497

Increase for the month, 206,800 tons, or 9.6 per cent.; increase for the six months, 100,355 tons, or 0.8 per cent. For the month, all the companies show an increase except the New York, Lake Erie & Western; for the six months, the Reading, the Delaware & Hudson and the Erie show losses, while the other companies have gains.

The stock of coal on hand at tidewater shipping points on June 30 last was 583,936 tons, being a decrease during the month of 27,505 tons, or 4.5 per cent.

Chicago and Ohio River Pool.

At a meeting held in Chicago, July 14, a new pool was formed on business between Chicago and Cincinnati and other Ohio River points. The companies concerned are the Illinois Central and the Cincinnati, Indianapolis, St. Louis and Chicago, which are to have 30 per cent. of the business; the Pittsburgh, Cincinnati & St. Louis and the Cincinnati, Hamilton & Dayton, which are to have 30 per cent.; the

Louisville, New Albany & Chicago, 20 per cent., and the Chicago & Eastern Illinois, 20 per cent. Only business from Chicago to Indianapolis, Louisville, Cincinnati, Jeffersonville, Madison and Evansville will be pooled. The arrangement goes into effect experimentally for three months from Aug. 1. The pool elected L. C. Richardson, agent Green line, General Manager of pooled business at Chicago.

Rates on Fruit from California.

The following rates on fruit from California points are made by the Central Pacific, the Southern Pacific, the Atchison, Topeka & Santa Fe and the Texas & Pacific. The rates are for car-load lots, a car-load to be not less than 20,000 or more than 28,000 lbs. by freight train, and not more than 24,000 lbs. if sent by passenger train. If refrigerator cars are used the load must not exceed 22,000 lbs. The rates are per 100 lbs.:

	Vegetables.	Green fruit.	Oranges, lemons and limes.
Los Angeles to			
Galveston	\$1.30	\$1.77	\$1.50
Kansas City	1.40	1.80	1.50
New Orleans	1.42	1.92	1.07 3/4
St. Louis	1.50	2.00	1.75
Chicago	1.50	2.57	1.75
New York			
Philadelphia			

No time will be guaranteed, the companies only agreeing to do all in their power to prevent transfer or unnecessary detention.

Business of New York Canals.

For the week ending July 14, the Canal Auditor reports:

	1882.	1881.	Decrease.	P. C.
Tons shipped	146,547	185,924	39,377	21.2
Miles cleared by boats	181,118	224,691	43,573	19.4
Tolls	\$17,010	\$22,877	\$5,867	26.5

The numbers of tons of leading articles shipped were:

	1882.	1881.	Inc. or Dec.	P. C.
Lumber	55,607	52,289	Inc. 3,318	6.5
Grain	20,712	39,298	Dec. 18,586	47.3
Iron and iron ore	19,362	30,134	Dec. 10,772	35.8
Salt	2,535	40,064	Dec. 2,129	45.6
Stone, lime and clay	7,723	7,334	Inc. 389	5.3
Coal	30,519	37,364	Dec. 6,845	18.3
Sugar and molasses	442	503	Dec. 61	12.0
Domestic wools and cottons	96	884	Dec. 788	90.0

It is noticeable that though east-bound rail rates at this time last year were higher than now, and canal shipments apparently should be stimulated by the freight handlers' strike in New York, still the shipments of such articles as are carried by rail and canal, as sugar and domestics, are much less by canal this year than last.

Iowa Trunk Lines Association Rates.

Mr. George H. Daniels, of the Iowa Trunk Line Association, has issued the following circular:

"On and after this date, and until notice of a change is given, on business destined to Council Bluffs and beyond (except California and Colorado business, and business to points on the Denver & Rio Grande Railway), originating at the Atlantic seaboard, and brought to Detroit, Toledo, or Chicago, via rail and lake, the following rates, in cents per 100 pounds, will be in effect:

	1st.	2d.	3d.	4th.
To Council Bluffs	45	76	50	34
From Detroit & Toledo	82	70	45	30
From Chicago	85	70	45	30

"The rates above quoted will govern on the business described, regardless of the rates applied on business carried, all rail, to destination."

Lumber Rates.

A meeting was held in Chicago, June 12, to consider the rates on lumber from lake ports and to settle certain disagreements in relation thereto. After some discussion, the whole matter was referred to a committee, to report to an adjourned meeting.

The Denver Pool.

At a meeting held in Chicago, July 15, an agreement was finally reached as to the division of business to and from Denver, Col. Under this agreement the Union Pacific is to have 51 per cent., the Atchison, Topeka & Santa Fe 50, and the Chicago, Burlington & Quincy 19 per cent. This agreement is to continue in force one year, when the percentages will be readjusted. Later advices are that the Union Pacific declines to approve this agreement.

THE SCRAP HEAP.

Locomotive Building.

The Grant Locomotive Works in Paterson, N. J., recently delivered five engines to the St. Paul, Minneapolis & Manitoba road.

The Brooks Locomotive Works in Dunkirk, N. Y., recently sold several engines to the St. Paul, Minneapolis & Manitoba road.

Car Notes.

Mr. W. K. Carr has been appointed General Agent for Van Liew's patent grain-door. This door is now being put in a large number of new cars for the Pennsylvania, the Chicago & Alton, the Chicago & Northwestern, the Chicago, St. Paul, Minneapolis & Omaha, the Northern Pacific, the Missouri Pacific, the Southern Pacific, the Central Pacific and other roads.

The Harlan & Hollingsworth Co. in Wilmington, Del., has bought the old Stotsenberg Foundry, which will be repaired and added to the works.

The Northwestern Car & Manufacturing Co. recently completed 24 cabooses for the St. Paul, Minneapolis & Manitoba road.

The Boston & Maine shops have lately finished two very handsome parlor cars for the road. They are to be used for the summer travel to New Hampshire and the White Mountains.

The Indianapolis Car Works are now employing 600 men. They are turning out box cars for the Louisville, New Albany & Chicago, and coal cars for the Cleveland, Columbus, Cincinnati & Indianapolis road.

The Buffalo, Pittsburgh & Western shops at Oil City, Pa., have begun to build several new passenger cars for the road.

The Laconia Car Co., at Laconia, N. H., has built two drawing-room cars for the Boston & Maine road.

The Pullman Car shop have recently delivered 10 day coaches to the Chicago & Northwestern, seven day coaches to the Chicago, St. Paul, Minneapolis & Omaha, 26 coaches to the Toledo, Cincinnati & St. Louis narrow gauge, and 10 day coaches to the New York, Lake Erie & Western.

The Litchfield Car Co. in Litchfield, Ill., is building 100 box and 100 flat cars for the Galveston, Harrisburg & San Antonio road.

It is said that the United States Rolling Stock Co. will make a large addition to its repair shops in Chicago.

Bridge Notes.

The Delaware Bridge Co., of New York, has the contract for a bridge over White River on the new Eureka Springs road.

The Morse Bridge Works in Youngstown, O., have a large order for bridge girders for the Pittsburgh, McKeesport & Youghiogheny road.

The Toronto Bridge Co. in Toronto, Ont., has a number of contracts for the Canadian Pacific and other roads.

Iron and Manufacturing Notes.

Mr. John H. Harris, formerly of the George T. Blake Manufacturing Co., and late of the Deane Steam Pump Co., has made a business connection with the house of Henry R. Worthington, and will have his headquarters at the New York office.

Mr. C. E. James, dealer in iron and railroad supplies at Chattanooga, Tenn., has admitted Mr. D. J. O'Connell to an interest in the business, and the firm will hereafter be C. E. James & Co.

The St. Albans Rolling Mill in St. Albans, Vt., is running on street rails for Boston and other cities.

At a meeting of the stockholders of the National Railway Signal Co., held at its office in Nashua, N. H., July 13, the following persons were elected directors for the ensuing year: Cyrus S. Haldeman, Elisha L. Converse, O. M. Shepard, J. Henry Read, O. M. Wentworth, Arthur P. Wilson, John B. Johnson, George W. Barnes, John L. Ambrose. Subsequently Maj. Cyrus S. Haldeman was elected President; Elisha S. Converse, Vice-President; Joseph B. Parker, Clerk; A. P. Wilson, Secretary and Treasurer. The business management will be in the hands of the President, with a local office in Boston.

The large rail mill of the Pennsylvania Steel Co., at Steelton, near Harrisburg, recently made 1,872 rails in 24 hours, averaging 47 seconds for each rail. This was done in 124 heats, aggregating 468 tons of metal.

The Ft. Pitt Boiler Works of D. W. C. Carroll & Co., in Pittsburgh, have contracts for 20 new 25,000-gallon oil tanks for the United Pipe Lines.

The Dover Rolling Mill, at Dover, N. J., recently rolled a bar of 3/4 in. round iron, 136 ft. long, or 6 ft. longer than the bar recently mentioned, which was then claimed to be the longest bar of that kind ever made.

A blast furnace at New Pittsburgh, Kan., is nearly ready to start up.

The new blast furnace at Rich Hill, Mo., is nearly finished, and will be put into blast as soon as it is ready for use.

Duquesne Forge of Wm. Miller, Son & Co. in Pittsburgh is full of orders and running full double turn.

The Standard Nut Co. in Pittsburgh is preparing to build new works.

A new concern has purchased the open-hearth plant lately owned by the bankrupt Siemens-Anderson Steel Co. The new company is styled the Linden Steel Co., Limited, and is composed of W. J. Lewis, Chairman; Henry Lloyd, Secretary, and M. D. W. Loomis, Treasurer. Mr. Lewis was formerly senior partner of Oliver Bros. & Phillips, Mr. Lloyd is of the firm of Henry Lloyd, Son & Co. and Mr. Loomis was formerly with Carnegie Bros. & Co., limited. The office is at No. 173 Wood street, and the works at Linden Station. The productions will be open-hearth steel ingots, blooms, billets, slabs, and spring, tire, machinery and agricultural steels, as well as special shapes. The capacity of the plant is 50 tons per day. The company have their own chemist and laboratory, and will make constant analytical tests of all steel produced by them.—Pittsburgh American Manufacturer.

Victoria Furnace in Rockbridge Co., Va., is nearly ready to go into blast. It is owned by an English company. A narrow-gauge road 11 miles long connects the furnace, the iron mines and the Chesapeake & Ohio road.

The Brooke Steel Rolling Mill in Louisville, Ky., will soon begin to run double turn.

The rolling mill at West Hamburg, Pa., began working on half time last week, and will soon change to full time.

The Rail Market.

Steel rails are unchanged. The only sales reported are some small lots for immediate delivery at \$48 to \$50 per ton at mill.

Iron rails are very quiet, with inquiries chiefly for light rails. Quotations are \$46 to \$48 per ton at mill, but large orders could probably be placed somewhat lower.

Spikes are quoted at \$3 to \$3.15 per 100 lbs.; fish-plates are firmer at \$2.65 to \$2.75, with short supply; track-bolts, \$3.75 to \$4.25.

Old rails are not in much demand, and quotations are nominal at \$27 per ton in Philadelphia for tees, and \$28 for double-heads.

Blast Furnaces of the United States.

The quarterly statement prepared for the Iron Age gives the condition of the blast furnaces of the United States on July 1 as follows:

	In blast.	Out of blast.	Not re-blasted.	Total.
Charcoal	151	126	4	281
Bituminous or coke	119	109	—	228
Anthracite	164	72	—	236
Total	434	307	4	745

The total weekly capacity of the 434 furnaces in blast is 93,021 tons; of the 307 out of blast, 57,228 tons.

Since April 1 there has been a decline of 42 in the number of furnaces in blast. The number of bituminous furnaces decreased 31 and of anthracite furnaces 11, while that of charcoal furnaces increased 19.

For six years past the condition of the furnaces reporting on July 1 has been as follows:

	In blast.	Out of blast.	Total.	P. C. in blast.
1882	434	307	741	58.6
1881	437	292	729	59.9
1880	413	313	726	56.9
1879	277	408	685	40.4
1878	248	460	708	35.0
1877	259	443	702	36.9

There has been but little change for three years past or since the great increase from 1879 to 1880. In the six years there has been an increase of only 39 in the total number of furnaces reported.

Seven Hours Going Seven Miles.

Strange as it may seem, a traveller at the Broad Street station was from 2:40 in the afternoon until 9:10 last evening in getting started for Kellyville, on the Central Division of the Philadelphia, Wilmington & Baltimore railroad. It was all owing to the man's remarkable confidence in himself. On reaching the station in the afternoon he rushed through the gate, refusing to tell the gateman where he was going, and so got on a Philadelphia, Wilmington & Baltimore train of the Maryland Division. When he got to Gray's Ferry they put him off and sent him back to the Broad Street station to start fresh. Still relying on his own information he boarded another train, which proved to be one bound for New York, so the conductor put him off at Germantown Junction and had him sent back for a third time for Kellyville. Another train was going out just as he got back to the Elevated, and the man for Kellyville got aboard again, but when he reached Fifty-second street the conductor put him off and sent him back to Broad street. Another train was going out of the station, and the man bound for Kellyville got aboard of it, and when Fifty-second street station

was reached the conductor put him off and sent him back to Broad street. By this time the man concluded he didn't know anything about the trains, so when he returned from his last trip he approached the gateman and, in a most appealing tone, said: "For mercy's sake tell me which train goes to Kellyville." This was, of course, done, and at 9:10 the man started for Kellyville—where he arrived after seven hours travelling—a distance of seven miles.—Philadelphia Record, July 16.

Paint for the Brooklyn Bridge.

The contract for supplying the Brooklyn Bridge with 10,000 gallons of paint has not yet been awarded. The following sealed proposals were offered last Saturday:

Ed. Smith & Co., per gal.	\$1.20
Ed. Smith & Co. per gal.	1.52
Sieley Bros. per gal.	1.30
C. W. McBride per gal.	.90
Harrison Bros. & Co. per gal.	1.40
New York Paint Co. per gal.	1.35
E. A. Woolsey per gal.	1.16 3/4
E. Blunt, per gal.	1.29
F. W. Devos & Co. per gal.	1.28
C. T. Reynolds & Co. per gal.	1.25
J. Masury & Son per gal.	\$1.15 or 1.00
H. W. Johns Manufacturing Co. per gal.	1.47
W. P. Husband per gal.	1.65
B. Hammond & Co. per gal.	1.48

The trustees of the New York and Brooklyn Bridge have advertised for proposals to furnish "10,000 gallons of paint, ready mixed for use." The paint must be furnished according to the following formula: "70 lbs. first quality white oxide of zinc; 30 lbs. best white lead; 6 gallons raw Calcutta linseed oil, with such staining material as may be necessary to produce the color desired. The paint must be thoroughly ground and must not weigh less than 18 lbs. per standard gallon." If the conditions on which proposals are solicited for iron, steel, brick and other material are as lucid and show the same amount of knowledge of the articles asked for on the part of the Engineer, then there need be no wonder that the cost of this structure has been swelled to twice the original estimate, and the time for its completion extended to three times the first allotted number of years.

Let us examine the conditions and see what manner of paint the bridge people call for: The formula as above given will make a little less than nine gallons of paint and will weigh just 145 lbs. Now the second clause of the conditions calls for paint to be made according to their formula to weigh 18 lbs. to the gallon, whereas it will weigh only 16 1/2 lbs. Made according to the Chief Engineer's formula, the paint, as we have already shown, will weigh 1 1/2 lbs. less than the standard required; but even then it is of such a consistency that it could not be applied with a brush and would be more fit for application with a trowel. Assuming, however, that the paint could possibly be made as directed, there are reasons why no one would or could give a low bid for the paint called for. The fact that the staining matter is left open to the Engineer to determine after the bid is made and accepted, is a fatal and inexcusable blunder. The colors used for such purposes range from one cent to four dollars per lb., and it is, therefore, readily seen that the bidder has to take great risks or make his price high enough to cover all contingencies. Another objection to the specifications is that no limit is given to the time when this paint is to be called for, whether it will all be wanted in six months, a year or two years, and so the contractor has to guard against a possible increase of price of material for which he can make no proper calculation. Taken altogether, these specifications show an amount of ignorance that is surprising, to say the least—or are we to believe that they were so made purposely that all bids could be rejected on the plea that the tender of paint was not according to the specifications?—Oil and Paint Review.

Railroads in Ceylon.

In a paper recently read before the Institution of Civil Engineers in Ireland, entitled "Engineering Notes in Ceylon," by H. F. A. Robinson, the author says: "The centre of Ceylon is mountainous, and it is only of late years that a trace was discovered by which a railway could be brought up to Kandy from the low country. As it is, the line runs for about 50 miles nearly level, and then ascends for 12 miles at a uniform gradient of 1 in 40, with curves as sharp as 5 1/2 chains. Two engines are necessary to take the train up this pass, and the time for the distance is over an hour. Coming down, brakes are applied to every car separately, which, as may be imagined, has the effect of greatly shortening the life of the rolling stock. The gauge of this line is 5 ft. 6 in., or the ordinary Indian gauge. The sleepers, which are all imported, are cross-tied, which, besides improving the sleeper, renders it impervious to the ravages of white ants. The carriages are very similar to those in ordinary use at home, although they are better ventilated; but they are very stuffy and uncomfortable, and, in fact, not fit for the climate. American cars would be much more suitable for the European passenger traffic, as they have through ventilation, which is so necessary in the East."

Emery Wheels for Export.

Some months ago the Tanite Co. received an order from one of the foreign governments for a solid emery wheel 36 in. in diameter and 8 in. in thickness. A wheel of this size weighs about 800 pounds, and its list price is \$500. A few weeks since the company received a cable order from their Liverpool house for a special machine on which to run this immense wheel. They are now constructing this machine, which is the largest they have yet built. It is from an entirely new design, and will weigh, when complete, 2,200 pounds. When finished, illustrations of this machine will appear in some of the scientific papers.

The company received last week an additional order from the same government for nearly \$3,000 worth of solid emery wheels. Notwithstanding the recent enlargement of their works and increase of hands, they are kept busier than ever.—Stroudsburg (Pa.) Jeffersonian, July 20.

A Runaway Coal Car.

The Middletown Argus says that last Tuesday a car loaded with coal was switched at Summitville, on the Ellenville Branch of the Ontario & Western Railroad, and getting under motion ran all the way to Ellenville, a distance of eight miles, finally running off the end of the road and bringing up a complete wreck in a yard. Although the branch road is a down grade, there are a number of up grades on it, but such was the momentum of the runaway car that it succeeded in climbing all the summits and made the run in quicker time than it would have done behind a locomotive.

Too Bad.

There was an accident up the road the other day, and when the Derrick reporter arrived at the scene of the wreck, and desolation, and profanity, and Italian expletives, and kindling wood, and mad passengers, he was directed to the most solemn man on the spot for an explanation of the mishap. "Was it a freight-train?" asked the reporter. "Yes," said the solemn man, "I'm a freight it was." Two of the passengers were carried away in a fainting condition, and the reporter was steadied up against the fence until he

recovered. The solemn man continued: "It was rail bad." This knocked two Italians down and broke the guy rope. "No," said he, "I can't tender you any information; you can track it;" when the baggageman hit him over the head with a wrench, but his last words were, "lok-a-motive for the accident up yourself."—*Oil City Derrick.*

The officers of the Nantucket Railroad have recently received a letter of inquiry from a "tracer," who evidently had little knowledge of the connections of the line, as to whether or not certain freight-cars had strayed into their yard. The yardmaster at once instituted a vigorous investigation, but no cars were found not bearing the private mark of the N. R. R.—*Boston Advertiser.*

The Nantucket Railroad is separated from the nearest railroad by some 25 miles of deep water.

A Narrow Escape.

What might have proved a serious accident was averted, yesterday, on the Erie railway, near Warsaw, by the prompt application of the air-brakes. As the express which leaves Hornellsville at 8 a. m. was proceeding at a high rate of speed after passing Warsaw, the train was brought to a sudden standstill. Investigation disclosed a large stone in the centre of the track and one large stone lying on each side of the rails, a rod ahead of the engine. The boulders had fallen from a freight car, and had they not been discovered as they were, and the air-brakes promptly applied—a serious accident must have been the consequence.—*Rochester Post-Express, July 11.*

OLD AND NEW ROADS.

Atchison & Southwestern.—This company has been organized to build a railroad from Atchison, Kan., southwest to a point on the Kansas River, about 100 miles.

Blue River.—This company has been organized to build a railroad from Manhattan, Kan., northwest up Blue River to Marshall, about 60 miles.

Boston & Maine and the Eastern.—The Boston Advertiser of July 15 says: "A meeting was held yesterday afternoon of the committee of the Boston & Maine directors which has under consideration the proposition of the directors of the Eastern road for leasing that road to the Boston & Maine. We are informed that the committee prepared some amendments to its first proposition, which after being approved by the full board of directors will be sent to the Eastern directors. This makes the fourth proposition in the course of the negotiations; the first having come from the directors of the Eastern road, and the second being a counter proposition by the Boston & Maine, which was met by a third and different offer from the Eastern. It is considered an open question whether the Eastern road will accept or reject the terms offered yesterday. The bondholders would probably accept them, but the stockholders are inclined to ask more than the Boston & Maine is willing to grant. Of course any arrangement to be binding must be finally approved by the stockholders of both roads, but the stockholders of the Boston & Maine would probably approve the action taken after due deliberation by their board of directors. The latter board will meet within about a week to ratify the action taken by its committee. If the Eastern should be leased, as proposed, the two roads would be under one management and have one superintendent. Whether the two passenger stations in Boston would be used is undecided. The train arrangement would be at once more economical to the roads and more satisfactory to the public than at present. Each road now runs five trains daily to Portland, making ten in all, but as each road feels obliged to run on about the same time as the other, there are practically only five different hours to choose. Under one management the number of trains would probably be reduced to eight, but each would run at a different time, and there would be eight instead of five different hours for going to Portland. It seems to be conceded that union would be beneficial to both sides, but there is a disagreement as to the terms, which may prevent any arrangement."

A difficulty suggested is that the Eastern lines in New Hampshire could not be transferred to the Boston & Maine without a special act of the Legislature. This matter could probably be arranged.

Brighthope.—Surveys are being made for a branch of this road from Summit, Va., West to some coal mines in Midlothian.

Central Iowa.—On the branch line known as the Chicago, Burlington & Pacific (now owned by this company) track is reported laid from New Sharon, Ia., northwest to Newton, 38 miles. Grading is also in progress on the same line from Oskaloosa toward Burlington.

Central Vermont.—The following is the decision of the Vermont Supreme Court, sitting in and for Franklin County, in the Langdon suit, which was brought as a test case to decide the relative claims of the different creditors to the Vermont Central and the Vermont & Canada roads: "In the case of J. P. Langdon et al., against the Vermont & Canada Railroad and others, the decree of the Court of Chancery is reversed and the suit is remanded to that Court, with directions to cause the accounts of the managers of the trust property, from the time the trust was created by decree of the Court in 1861, until the present time, to be settled; and all equitable offsets ascertained and applied. Also, that the managers in possession of the property be required to file and settle their accounts at frequent stated times, so that the condition of the trust may be readily ascertained at any given time."

"It is adjudged that all debts and liabilities of the receivers and managers that accrued in the legitimate administration of said trust, and indebtedness of the managers that accrued in transactions that were requested, sanctioned or agreed to by the primary parties as the proper debt or duty of said management, are a lien, and should be made a charge in the nature of an equitable mortgage upon the whole property which is the subject of the trust, including the Vermont Central Railroad and the Vermont & Canada Railroad, their privileges and appurtenances, also including the franchise to operate said railroads, and all property, claims and assets pertaining thereto, in the hands or possession of said managers, superior to the claims of the Vermont Central Railroad Company, its mortgage bondholders, and the Vermont and Canada Railroad Company. And in consideration of the fact that in case the defendants redeem the said property, by the payment of the aforesaid indebtedness, constituting a lien or equitable charge thereon, as in this decree is established, there may then exist no occasion or necessity for the enforcement of the rights, liens and priorities, as between themselves, of the holders of said indebtedness, it is deemed unnecessary to ascertain such rights and priorities at the present stage of the cause; but the same are reserved without prejudice for future ascertainment and enforcement in this cause, in case there should be occasion therefore by a failure of defendants to redeem or otherwise; and this cause is to be retained and continued on the docket of the Court for that purpose, and any person interested in said rights, liens and priorities, also the Rutland Railroad Company, shall be at liberty at any time

thereafter to move the Court for the ascertainment and enforcement thereof in this cause."

"The Court will at once adjudicate the exceptions to the masters' report upon the receivers' and managers' accounts, prior to the appointment of the Central Vermont Railroad Company manager in 1873, and cause the accounts of the Central Vermont Railroad Company, as manager, to be settled at an early day, and cause all sums that are, or in equity should be, in the hands or possession of such manager to be first applied in extinguishment of the indebtedness of said receivership; and, as this cause has been long in court, the Court is required by stringent orders to exact the utmost diligence of the parties in settling and bringing to final determination all disputed claims, and all equitable offsets growing out of the administration and management of said property."

"And when said accounts are settled and all equitable offsets, if any, are ascertained and applied, the Court will pass a decree for the orators for the residue of the indebtedness of said receivers and managers, declaring the bonded debt, as enumerated in the decree of the Court of Chancery in this cause, and the 'floating debt' so-called, and the Central Vermont claim and the Grand Trunk claim as found by the masters, and any and all debts that are found to have accrued in the legitimate administration of the property, by the receivers and managers to be an equitable lien, or charge in the nature of an equitable mortgage upon the Vermont Central Railroad and the Vermont & Canada Railroad, their privileges and appurtenances, including the franchises to operate said roads, and all the equipment, property, claims and assets appertaining thereto, and to the receivership and management thereof, superior to the claims of the Vermont & Canada Railroad Company, the Vermont Central Railroad Company and its first and second mortgage bondholders. In settling the accounts of the managers, the Court will follow the rule that obtains in equity in regard to receivers and managers of such property. The expenditure of funds for a reading-room, though a proper charity, is not a legal accounting for trust funds; also expenditures for the 'tramway' road in Canada, and perhaps the Missisquoi Railroad and the Northern Transportation Company, if allowed as a charge against the property, must find warrant for it in the consent and agreement of the primary parties, and is purposely left open until all the facts shall be made to appear in the master's report."

"And the Court will further decree that the said several sums so ascertained by the Court shall be paid by the defendants to the Clerk of this Court for the benefit of the respective parties who are creditors, with interest, on a day fixed by the Court as a reasonable time; and that, upon failure of said defendants to make payment of said several sums, as above ordered to be paid, or any of them, at the time fixed, then the Vermont Central Railroad Company and the bondholders under the first and second mortgages of the Vermont Central Railroad, and the Vermont & Canada Railroad Company and all the defendants shall be decreed to be forever foreclosed and barred of all right and title, interest and estate in the Vermont Central Railroad and the Vermont & Canada Railroad; the privileges and appurtenances pertaining thereto and to each of them, including the franchises to operate said roads, and in all the equipment, claims, assets and property appertaining or belonging to said roads, or either of them, as well as the receivership and management thereof; and on such failure the Court will order all the defendants to release all interest which they may have in said property to some suitable trustee, to be appointed by the Court, to hold the same in trust for such trust creditors. The Court will, in its decree, give additional time for redemption to the mortgage bondholders and the Vermont & Canada Railroad Company respectively, in the order named, so that each party in interest may have opportunity to redeem in case of failure of the preceding party to do so. And, as this Court sees no good reason why a final decree in the premises may not be made at or before the next regular session of the Supreme Court in this county, to assure that end the Court will make orders as to times of taking and filing testimony and making report and the 'taking as confessed' matters of fact as against parties at fault as to the Court may seem just and reasonable. This cause is remanded to the adjourned term of the Court of Chancery of Franklin County, to be held at St. Albans on the 15th of July, 1882."

Chicago, Milwaukee & St. Paul.—The work of ballasting the new Council Bluffs Extension is progressing very well. Regular passenger trains will probably not run to Council Bluffs before Sept. 1, as the company wishes to have everything in good order before the road is opened.

Work has again been begun by this company on the line from Sigourney, Ia., to Ottumwa. Most of the distance was graded several years ago.

Chicago & Northwestern.—The narrow-gauge line between Montfort and Lancaster, Wis., has been changed to standard gauge, and trains now run through between Madison and Lancaster.

Chicago Suburban.—This company has been organized to build a loop or second line from the Chicago & Pacific Division of the Chicago, Milwaukee & St. Paul road at Galewood by way of Jefferson and Norwood Park back to the same division again in Chicago. The road will be about 10 miles long, and will reach several suburban towns.

Cincinnati, Hamilton & Dayton.—The directors have approved an issue of \$1,000,000 new 6 per cent. preferred stock, the money to be used to improve the road and buy new equipment. The stockholders will meet Aug. 16 to vote upon the proposed issue.

Columbus, Hocking Valley & Toledo.—The Detroit Post and Tribune of July 18 says: "Special advices to the Post and Tribune tell of the purchase of the Columbus, Hocking Valley & Toledo Railroad by the Standard Coal & Iron Company, and of the intended extension of the road to Detroit. The Standard is the great company of which James G. Blaine is a prominent member, whose property includes nearly all the valuable coal lands and furnaces of the Hocking Valley in Southeastern Ohio. The company begins business on a capital of \$75,000,000."

Connecticut River.—The board of directors recently authorized the issue of 2,700 shares of new stock, and 1,000 shares are to be sold at public auction in Boston next month. The company has no bonded debt, and the stock is quoted at 160. The money received for the new stock will be used for improvements, new stations and new bridges.

Danville & New River.—The people of Patrick County, Va., have voted a subscription of \$300,000 in aid of the extension of this road. By the terms of the subscription all the money is to be expended on the line through the County.

Denver, Golden & Salt Lake.—This company has sold its property, consisting of right of way and partly graded road-bed between Denver, Col., and Golden, for \$22,000, to parties who say they will complete the road.

Denver & Rio Grande.—The Pueblo & San Juan Division is now completed to Silverton, Col., in the centre of the San Juan mining region, for which a large business has already come to the road. Silverton is 45 miles north-

ward from the old terminus at Durango, 375 miles from South Pueblo and 495 miles from Denver. This division will not be extended any further at present.

East Tennessee, Virginia & Georgia.—Track on this company's Cincinnati & Georgia line is now laid to Dallas in Paulding County, Ga., 37 miles from Atlanta. Regular trains have begun to run between Atlanta and Dallas, and also between Atlanta and Macon.

This company's lines will hereafter be worked in the following divisions.

The East Tennessee Division, comprising the line from Bristol to Chattanooga, and the North Carolina Branch, from Morristown to Warm Springs; the Ohio Branch from Knoxville to Kentucky state line and the Cleveland Branch, from Cleveland to Cohutta Junction. The headquarters of this division will be at Knoxville, Tenn. The Georgia Division, comprising the line from Ooltewah Junction through Dalton, Rome, Atlanta and Macon to Brunswick, Ga., together with Hawkinsville Branch from Cochran to Hawkinsville. Headquarters of this division to be in Atlanta, Ga. The Alabama Division, comprising the line from Rome through Selma and Lauderdale Junction to Meridian, Miss. Headquarters of this division to be at Selma, Ala. The Memphis & Charleston Division, comprising the line from Chattanooga to Memphis and the following branches: Florence Branch, Tusculum to Florence; Somerville Branch, Moscow to Somerville. Headquarters of this division at Memphis, Tenn. Until such time as the new road between Atlanta and Rome is completed and opened for business, that portion of the line lying between Rome, Ga., and Cleveland, Tenn., will continue to be operated from Selma as part of the Alabama Division.

Eureka Springs.—The contract for the grading and masonry of this road has been let to Jones & Cowen for \$200,000. The work is to be finished by December. The road is to be run from the St. Louis & San Francisco at Seligman, Mo., to Eureka Springs, Ark., about 35 miles.

Galveston, Harrisburg & San Antonio.—On the El Paso Division, which is built and worked by the Southern Pacific, track is now laid for 354 miles from El Paso, Tex. Work progresses steadily, but slowly, the country being very rough and hilly. It is expected that the tracklayers from the two ends of the line—El Paso and San Antonio—will meet at a point about 400 miles from El Paso.

Gulf, Colorado & Santa Fe.—A dispatch from Dallas, Texas, July 15, says: "The strong opposition of the Gould roads and the Houston & Texas Central to the new line now working into Dallas and the Gulf, Colorado & Santa Fe, has forced the latter line to endeavor to secure an alliance at this point with the Texas & St. Louis for an independent and direct route to St. Louis. Walter Gresham, Chief Attorney, and B. M. Temple, General Freight Agent, have been in consultation to-day with the Railroad Committee of the City Council to secure right of way into the business part of the city. The Council will, no doubt, grant it. Mr. Gresham visits St. Louis next to consult with the narrow-gauge officials."

Hannibal & Southwestern.—This company has been organized to build a railroad from Hannibal, Mo., southwest across the state to the Kansas line, with a branch to Kansas City.

Hanover Junction, Hanover & Gettysburg.—Surveys have been made for a branch from Gettysburg, Pa., to the Gettysburg battle-field. The distance is about three miles.

Hudson Tunnel Railroad.—In the north tunnel on the New Jersey side of the Hudson River Tunnel 25 ft. have been completed during the last week. The total distance now completed on the Jersey side is 1,197 ft. in the north tunnel, 563 ft. in the south tunnel. The heading of the north tunnel having been advanced 475 ft. from the river air-lock, a new air-lock is being set up about 20 ft. from the heading. An auxiliary air-lock for passing timber is being put in the same bulkhead. In the north tunnel, on the eastern side of the river, the plates of the new section, which is 15 ft. long, have been carried down about two-thirds of the circle. The nature of the earth has improved, and less difficulty has been met than heretofore. The steam power on the New York side has been found inadequate to supply the air-compressors, and a large boiler is being set up to supplement those already in use.

Indiana, Illinois & Iowa.—A suit has been begun by certain bondholders of the old Plymouth, Kankekee & Pacific road, to set aside the sale by which the partly graded road-bed, etc., passed into the possession of this company.

Indianapolis & Vincennes.—A survey has been made for a branch from Switz City, Ind., westward to the block coal fields. It will be about eight miles long.

Lake Erie & Western.—Reports have again been in circulation of the sale of a large interest in this road to Mr. W. H. Vanderbilt. It is impossible to ascertain whether there is any truth in them.

Lehigh & Hudson River.—The last rail was laid on this road last week, and regular trains will begin to run through about Aug. 1 from Belvidere, N. J., to Greycourt, N. Y., a distance of 63 miles. From Greycourt the line is extended to the Hudson River by the Newburg Branch of the Erie, and the new road thus completes a very direct rail route from the Pennsylvania coal fields to the Hudson River. A considerable business is expected in coal and iron ore, and the road has already a fair local business, chiefly in milk and ore. It runs through a very fertile and picturesque country, in which the production of milk and butter is the chief industry. Several large iron mines will be connected with the road by short spurs.

Louisville, Evansville & St. Louis.—Track is reported laid on the gaps in the main line, completing the line of 182 miles from New Albany, Ind., to Mt. Vernon, Ill. At the last-named place connection is made with the Louisville & Nashville's St. Louis Division, by which it is 78 miles to St. Louis, making the whole distance from New Albany to St. Louis 260 miles.

The company now has 255 miles of road, the main line of 182 miles; the Evansville Division, from Evansville, Ind., to Jasper, 55 miles, and the Rockport Branch, of 18 miles.

Louisville & Nashville.—On the extension of the Knoxville Branch track is now laid to London in Laurel County, Ky., 14 miles southeast from the old terminus at Livingston, and 154 miles from Louisville. Work is progressing steadily beyond London, where there is some heavy grading.

Massachusetts Central.—A press dispatch from Boston, July 13, says: "A number of the largest bondholders of the Massachusetts Central Railroad met, and, in conjunction with the permanent committees, considered the plans for relief suggested, and finally voted to recommend a complete reorganization of the board of directors. Three plans are now proposed: First, to issue \$1,500,000 new bonds, with interest on the same guaranteed; make the present bonds preferred stock, on which interest shall be paid only after the interest on the new bonds is fully met. The stock

in this case becomes a third security, having a nominal value. Second, issue new consolidated mortgage bonds of \$1,500,000, making the new bonds preferred bonds, interest payable after that on the new bonds. One mortgage, in this case, to include all the bonds. Third, a proposition similar to the plan recently adopted by the Connecticut Valley road. It recommends the assessment of \$350 on the cash bond, giving in return a bond of face value of \$1,500. In this way \$225,000 would be secured. Each plan has its own advocates, and one of the three is expected to be adopted.

On the following day the directors met and resolved to resign whenever requested to do so, in order to permit the election of representatives of the bondholders. Two changes have since been made in the board, and Mr. S. N. Aldrich chosen President in place of Mr. Boutwell.

On July 18 the equipment of the road was withdrawn by the American Car Company, lessor. The officers of the road, however, borrowed engines and cars enough to keep trains running.

It is probable that an arrangement will be made with the Worcester & Nashua Company to operate the completed portion of the road for the present. This would make the road part of a line between Worcester and Boston short enough to compete for passengers with the Boston & Albany.

Mexican Central.—This company asks for proposals for furnishing 2,000,000 feet of bridge timber, 78,000 lineal feet of piling and 500,000 cross ties. Bidders will state the kind of timber, piling or ties they propose to furnish and the quantity they can furnish each month, commencing with the month of August, and must also state the price for which they will deliver the same, f. o. b. cars at El Paso, Tex. Specification and blank proposals will be furnished on application to Geo. H. Matfield, Timber Inspector, or to George T. Anthony, General Superintendent, at El Paso del Norte, Mexico.

Milwaukee & Northern.—All arrangements are completed by this company for resuming possession of its road on Aug. 1, when the lease to the trustees of the Wisconsin Central will expire, pursuant to notice.

On the Wisconsin & Michigan Extension track is now reported laid to Stiles, Wis., 27 miles northward from Green Bay. North of Stiles the work is being pushed, and the company hopes to have track laid to Pike River, 50 miles, this season.

Minneapolis & St. Louis.—It is announced that this company has made arrangements to run its passenger trains to Des Moines, Ia., using the Des Moines & Ft. Dodge track from Angus to Des Moines. Fulltrains will be run through, the Des Moines & Ft. Dodge Company furnishing motive power over its own road.

New Bonds.—New issues of bonds have been put upon the market as follows:

The **Minneapolis & St. Louis Company** offers, through Morton, Bliss & Co., of New York, its Southwestern Division 7 per cent. 30-year bonds, and Pacific Division 6 per cent., 40-year, first-mortgage bonds. Amount of issue not stated.

Ocean Steamship Company bonds, guaranteed by the **Central Railroad & Banking Company, of Georgia**, are offered through P. W. Gallaudet & Co., of New York. The total issue is \$1,000,000, secured by first mortgage on the steamships and other property of the Ocean Steamship Company, which is the organization through which the Central Railroad Company operates a steamship line between Savannah and New York.

New Orleans Pacific.—A dispatch from New Orleans says: "The last rail on the New Orleans Pacific road, connecting this city by the Texas & Pacific and the Southern Pacific with San Francisco, was laid to-day at a point just beyond the Atchafalaya River. The City Council yesterday granted the site of the Claiborne Market in this city to the road for a union depot, and President Wheelock left for New York last night to complete his work."

The New Orleans Pacific, as completed, extends from Algiers on the Mississippi, opposite New Orleans, to Shreveport, 324 miles, with a branch eight miles long to West Baton Rouge. It is worked as part of the Texas & Pacific, that company holding all the stock. The gap in the road from the Atchafalaya River northwest, which has just been completed, was a difficult piece of work through a swampy region. The Atchafalaya bridge is not quite finished, and a transfer boat will be used for the present at the river.

New York Central & Hudson River.—The contract for the new passenger station and train-house in Rochester, N. Y., has been awarded to George H. Thompson & Co., of that city, the work to be done by October.

The company has given the trackmen and switchmen on the main line a small increase of pay. An increase in the wages of other employes is expected to follow.

New York Freight Handlers' Strike.—The strike of the New York freight handlers still continues, but there is now apparently but little prospect of the success of the strikers. The companies generally have been able to get plenty of new men, and, although the new force has required much weeding out and some of the men have given much trouble, they are generally able to handle the freight with but little delay. Officers of the companies claim that by careful selection and by the discharge of men found incompetent they are gradually getting together a force which will in a short time be quite as competent as the old ones. On the other hand the men say that they can manage to get along now, when shipments are light, but that there will be serious delay when the heavy fall shipments begin.

There is still, however, much complaint among merchants about delays in receiving and forwarding freight, and some claim that the injury done to business is a very serious one. The delays are especially felt in local freights, which are said to have been neglected in order to get through freight handled without delay.

On Tuesday and Wednesday of this week argument was heard by Judge Haight, of the New York Supreme Court on an application made by Attorney-General Russell for a writ of *mandamus* to compel the New York Central & Hudson River, and the New York, Lake Erie & Western companies to receive all freight offered and forward the same without delay, in compliance with their obligations as common carriers. The arguments were not completed on Wednesday.

New York, Lake Erie & Western.—The brakemen and yardmen of the Eastern Division have asked the company to restore the 10 per cent. which was taken from their wages several years ago.

Messrs. Drexel, Morgan & Co. have made an arrangement with the company to extend, at 4½ per cent., for 40 years from their maturity, the third mortgage bonds of the New York and Erie Railroad Company, which mature on March 1, 1893. The present holders of the bonds have the option to extend their bonds without cost by depositing the same with Messrs. Drexel, Morgan & Co. for that purpose prior to Dec. 31, 1892. The total outstanding issue is \$4,852,000. This is a similar negotiation to those previously made by the same company for the extension of the second and fourth

mortgages of the New York & Erie Railroad Company, which were extended at 5 per cent., and are now selling at 111 and 108 respectively.

Northern Pacific.—On the western end of this road track is now laid to Cabinet Landing, Idaho, which is on Clark's Fork, 283 miles from Wallula Junction, and 55 miles from Lake Pend d'Oreille.

On the eastern end the tracklayers are 186 miles west of Glendive and 28 miles west of the late terminus at Gray's Bluff, Montana. The grading is done for 130 miles further.

Ohio & Mississippi.—Receiver Douglas' report to the Court for June is as follows:

Cash on hand June 1.....	\$133,000
Receipts from all sources.....	379,000
Total.....	\$512,000
Disbursements.....	268,614
Balance, July 1.....	\$243,455

The receipts exceeded the disbursements by \$110,446 for the month.

Pennsylvania & Martin's Creek.—At the annual meeting, July 18, a report was read showing that favorable progress had been made. It was expected that the entire work of construction of the road, which extends from Martin's Creek to Bangor, on the Belvidere division of the Pennsylvania Railroad, would be completed this year. It is hoped to have trains running by January next.

Rochester & Pittsburgh.—Track on the extension of this road is now laid to Tarport, Pa., 18 miles southward from the old terminus at Salamanca, N. Y. But a short distance remains to reach Bradford.

There has been some excitement over the stock of this company, and various reports have been current. One report was that the buying was for the Wabash interest, another that the Delaware, Lackawanna & Western wanted to secure control, still another being that a joint purchase by the two companies was intended.

St. Louis, Alton & Terre Haute.—In the suit of this company, Judge Drummond of the United States Circuit Court decides that the lease executed with the Indianapolis & St. Louis Railroad Company and the second guarantee contract dated Sept. 11, 1867, are valid and binding, but that the liability of each guaranteeing company (the Pittsburgh, Fort Wayne & Chicago, and Cleveland, Columbus, Cincinnati & Indianapolis) is one-third instead of one-half, because they never released the other, the Indianapolis, Cincinnati & Lafayette Company. The injunction in force is continued. The amount of rental overdue now amounts to about \$500,000.

St. Louis, Iron Mountain & Southern.—The following statement is published for the half year ending June 30:

Gross earnings.....	\$3,231,302.76
Operating expenses.....	1,583,337.98
Net earnings.....	\$1,647,964.78
Interest on divisional bonds.....	\$762,595
Interest on general consolidated bonds.....	250,000
Surplus.....	\$635,369.78

During the first six months of the year the traffic on this road is usually much lighter than that of the last six months.

Saratoga, Mt. McGregor & George.—Track is now laid on this road and regular trains begin running in a few days from Saratoga, N. Y., to Mt. McGregor, 10½ miles. The terminus is on a hill 800 ft. above the general level of the surrounding country, and the company there owns 1,000 acres of land, which is to be laid out as a park, and a hotel built. The road ascends the mountain by a grade of 211 ft. to the mile; its sharpest curve is one of 24 degrees.

Savannah, Florida & Western.—Surveys are being made for a branch of this road from Quitman, Ga., southwest to Monticello, Fla., about 30 miles.

Savannah & Tybee.—This company has been organized to build a railroad from Savannah, Ga., along the south side of the Savannah River to the sea shore on Tybee Island. The distance is about 18 miles.

Scioto Valley.—At the special meeting in Columbus, O., July 14, the stockholders voted unanimously to authorize the extension of the road from Columbus to Ft. Wayne, Ind., and to authorize the issue of \$5,000,000 new stock and the execution of a consolidated mortgage for \$7,500,000, in which all the present indebtedness is to be merged. The new stock and bonds are to be issued to pay for the extension.

Southern Pacific.—On the branch from Mohave, Cal., to the Colorado River, which is to connect with the Atlantic & Pacific road, the track is laid for 31 miles eastward from Mohave, and the graders are some 20 miles further out.

Union Pacific.—The following statement has been published for the half year ending June 30:

Miles worked.....	3,677	1881	3,446	Inc. or Dec.	233	P. c.	6.9
Gross earnings.....	\$13,055,244	\$10,553,081	\$1,502,163	23.8			
Expenses.....	6,955,384	5,911,007	1,044,377	17.7			
Net earnings.....	\$6,099,860	\$4,642,074	\$1,457,786	31.4			
Fixed charges.....	3,396,000	3,437,505	41,505	1.2			
Surplus.....	\$2,703,860	\$1,205,169	\$1,498,691	124.3			

The expenses were 55 per cent. of earnings this year, and 56 per cent. last year. The surplus for the half-year is equivalent to 4.4 per cent. on the stock.

Victoria Furnace.—This railroad is now completed from the Chesapeake & Ohio at Goshen, Va., to the new Victoria Furnace, 1½ miles, and thence to the iron ore beds on the Abrams estate, 10 miles. The section from Goshen to the furnace was built last year. The road and furnace are owned by the Iron & Steel Association of Virginia, an English company. The road was built for the purpose of carrying iron ore, but it is also used for passengers, the terminus being only about two miles from the Rockbridge Alum Springs.

Virginia Railroad Projects.—The following is a list of the new charters granted by the Virginia Legislature at its last session:

Allegheny Extension. to run from any point on the Richmond & Allegheny west of Lynchburg to the West Virginia line; with authority to consolidate with the Richmond & Allegheny and any company in West Virginia.

East River. to build branches of the Norfolk & Western in Giles, Tazewell, Buchanan and Dickinson counties; with authority to consolidate with the Norfolk & Western.

Farmville & Staunton River. from Farmville to the Staunton River at Brookneal.

Fauquier & Rappahannock. from a point on the Virginia Midland to Sperryville, in Rappahannock County.

Henrico. from Hungary on the Richmond, Fredericks-

burg & Potomac to James River, with extension to the Chesapeake & Ohio. This is a coal road.

Iron Belt. from Buchanan to the narrows of New River, with branches to mines.

James River & Blackwater. from James River at Burwell Bay to Proctor's Bridge on the Blackwater in Isle of Wight County, with branches. This is a lumber road.

Massanutten & North Mountain. from Strasburg or River-ton by New Market and Brock's Gap to the West Virginia line, with branches.

Norfolk & Cincinnati. to run from Wytheville or Emory to the Kentucky line and a connection with any line in Kentucky or North Carolina.

Richmond & Louisville. consolidation of Richmond & Southwestern, and Kentucky & Ohio, to run from Portsmouth to the Kentucky line, with branches.

South Atlantic & Ohio. re-organization of Bristol Coal & Iron Railroad; to run from Bristol to New River and Kentucky line, with branches.

Virginia Coal & Iron Co. to build roads or branches from Norfolk & Western, and South Atlantic & Ohio, in Lee, Wise, Scott, Buchanan, Dickenson, Russell, Tazewell and Washington counties, to reach mines.

Virginia Iron Trunk. to run from Botetourt County by Bickley's Mills, Salt Works, Clinch River and Big Moccasin Gap to the Tennessee line, with power to extend road to Lexington and to build branches.

Virginia & West Virginia. to run from Alexandria by Winchester, to the West Virginia line, in Frederick or Shenandoah counties, with branches.

Western North Carolina.—The work of renewing the ties and rails on the old part of the road is making steady progress, and most of it will be finished this season. The work of ballasting is also going on steadily. The troublesome Mud Cut is being widened and gradually reduced to order, and the sharp curve near its mouth has been changed, making a much easier approach. On the Ducktown Branch the grading is about done to the Cowee Tunnel, 60 miles from Asheville, and the convict force has been put to work on the tunnel. Track is now laid to a point five miles beyond Pigeon River and 21 miles from Asheville, and is advancing steadily.

Wheeling & Lake Erie.—Work is well advanced on the entrance of this road into Toledo, and trains will be able to enter the city as soon as the bridge is completed.

On the southeastern end of the road, track is now laid to Zoar, O., 12 miles southward from the late terminus at Massillon, leaving about five miles to complete the line to Canal Dover, where connection will be made with the Cleveland & Marietta road.

ANNUAL REPORTS.

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United New Jersey.

The property of this company, which is leased to the Pennsylvania Railroad Company, consists of 117.76 miles of main line owned; 30.60 miles of main line leased; 23.80 miles of branches owned; 256.71 miles of branches leased; the Delaware & Raritan Canal, 44 miles, and its branch, 23 miles; in all 428.87 miles of railroad and 68 miles of canal, besides the ferries across the Hudson River. The company owns a large and controlling interest in all its leased lines, and also owns a controlling interest in other lines not included in the report. The figures below are from the reports of the company and the State Director to the Comptroller of New Jersey for the year 1881.

The capital account is as follows:

Stock.....	\$21,080,400
Funded debt.....	19,976,000
Bonds and mortgages.....	954,903
Total.....	\$42,021,303
Cost of property.....	\$36,062,225
Investments in leased and other auxiliary lines.....	6,549,845
Total.....	\$43,212,070

Excess of property.....\$1,190,767
The funded debt consists of various issues, all bearing 6 per cent. interest, except a bond for \$100,000, held by the State of New Jersey, which bears 7 per cent.
The investment in leased and auxiliary lines is made up of

stocks owned costing \$4,659,309; bonds costing \$59,850, and advances made amounting to \$1,830,686.

The account with the lessee for improvements and additions to property, from the date of the lease to Dec. 31, is as follows:

New construction.....	\$5,918,070.12
Real estate.....	969,863.65
Harsimus Cove improvement, construction.....	2,237,580.50
of way.....	674,583.00
Total.....	\$9,830,097.33
Sale of bonds, etc.....	\$5,933,398.93
United N. J. stock issued to lessee.....	2,800,000.00
Total.....	\$8,733,398.93
Balance due to lessee.....	\$1,097,298.40

The expenditures during 1881 were as follows: New construction, additional tracks, etc., \$636,382.91; real estate, \$108,421.41; Harsimus Cove real estate, \$50,000; Harsimus Cove construction, \$111,808.68; total, \$906,613.00.

The Harsimus Cove improvement is the freight terminus on the Hudson River.

The traffic for the year, as reported by the lessee, was as follows:

Passengers carried.....	9,122,146
Passenger-miles.....	197,366,974
Tons carried.....	7,388,955
Canal.....	1,710,188
Canal.....	480,995,398
Canal.....	68,981,905

The average receipt per passenger-mile was 2.047 cents; cost, 1.502 cents; net receipt, 0.545 cent. The average receipt per ton-mile was 1.487 cents; cost, 1.064 cents; net receipt, 0.423 cent.

The earnings for the year were as follows:

Freight.....	\$7,152,711
Passengers.....	4,603,907
Mail and express.....	497,780
Miscellaneous.....	227,390
Total (\$29.104 per mile).....	\$12,481,788
Expenses (68.73 per cent.).....	8,578,997
Net earnings (\$9.100 per mile).....	\$3,902,821
Canal earnings.....	\$541,077
Canal expenses.....	232,314
Total net earnings.....	\$4,211,584

The total net earnings showed an increase over the previous year of \$882,110, or 26.5 per cent.

The canal earnings were \$8,198 per mile gross, and \$4,678 net, the expenses being 42.94 per cent. of earnings.

The result of the year was as follows:

Net earnings.....	\$4,211,583.90
Interest and dividends on investments.....	210,836.40
Total.....	\$4,422,420.30
Interest on bonds, etc., rental of leased lines, other rents, etc.....	2,631,245.16
Balance.....	\$1,791,175.29
Dividends paid, 10 per cent.....	2,094,040.00
Apparent loss to lessee.....	\$302,864.74

In 1880 the apparent loss to the lessee was \$1,035,308.87, showing a decrease of \$732,444.13 last year.

The surplus over all charges for the year was equivalent to 8.49 per cent. upon the stock.

Southern Pacific.

This company owns two distinct lines or systems: The Northern Division, which is worked by the company, is a line from San Francisco to Soledad, 143 miles, with a branch from Carnadero to Tres Pinos, 18 miles, and the Monterey road, from Castroville to Monterey, 15 miles, making 176 miles in all. The Southern Division extends from Huron to Yuma, 529 miles, with a branch from Los Angeles to Wilmington, 22 miles, 551 miles in all; it is leased to the Central Pacific Company. The two divisions are to be connected by an extension from Soledad to Lerdo Junction, 160 miles. The report is for the year 1881.

The equipment consists of 48 engines, 76 passenger and 13 baggage, mail and express cars, 603 box and 350 flat cars, 206 service cars.

The general account is as follows:

Stock.....	\$36,763,900
Bonds.....	28,483,000
Accounts, etc.....	1,817,451
Profit and loss.....	503,463
Total.....	\$67,567,814
Road and property.....	\$64,947,583
Accounts and balance.....	2,114,818
Materials.....	88,202
Cash.....	417,211
Total.....	\$67,567,814

The bonds are all first-mortgage 6 per cent. bonds, issued in series as the road progressed.

The Monterey Railroad, nominally leased, is substantially owned by this company.

The traffic of the Northern Division was as follows:

Train miles.....	475,398
Passengers carried.....	480,133
Passenger miles.....	16,931,395
Tons freight carried.....	263,544
Ton miles.....	18,611,167

This division has a considerable local and suburban traffic out of San Francisco.

The earnings of the Northern Division for the year were as follows:

Freight.....	\$928,858	\$541,267	I.	\$87,531	16.2
Passengers.....	475,443	425,212	I.	50,231	11.8
Other.....	28,223	27,717	I.	506	1.8
Total.....	\$1,432,524	\$994,196	I.	\$138,328	13.9
Expenses.....	806,225	551,430	I.	254,795	46.2
Net earnings.....	\$626,299	\$442,766	D.	\$110,467	26.3
Gross earn. per mile.....	6,435	5,649	I.	786	13.9
Net.....	1,854	2,516	D.	662	26.3
Per cent. of exps.....	71.2	55.5	I.	15.7	

The gross earnings of this division show a very considerable increase.

The income account was as follows:

Net earnings Northern Division.....	\$336,290.59
Rental Southern Division.....	2,363,421.19
Total.....	\$2,699,711.78
Interest.....	\$1,723,650.00
Rentals.....	20,400.00
Other payments.....	174,445.81
Total.....	\$1,918,495.81
Balance, surplus.....	\$771,224.97

During the year work was begun on a branch from Mohave, on the Southern Division, to the Colorado River, about 250 miles.

The extensions of the Southern Division were finished to

LOCOMOTIVE RETURNS, APRIL, 1882.

Master Mechanics of all American railroads are invited to send us their monthly returns for this table.

NAME OF ROAD.	Miles operated.	Locomotives in service.	MILEAGE.		MILES RUN TO		AVERAGE TRAIN.	COST IN CENTS PER		COST PER MILE IN CENTS FOR					AVERAGE COST OF	
			Total.	Average per engine.	Ton of coal.	Cord of wood.		Loaded freight cars.	Passenger cars.	Freight car mile.	Passenger car mile.	Freight car mile.	Passenger car mile.	Coal, per ton.	Wood, per cord.	
Allegheny Valley, River Div.*	130	37	86,273	2,332	32.62		30.07	3.60	22.93	6.073	0.852	6.69	4.45	0.61	6.54	18.29
Low Grade Div.*	120	28	48,317	2,057	38.50		17.80	2.50	22.20	3.480	0.798	6.50	4.50	0.70	6.50	14.70
Buffalo, Pitts. & Western*	174	30	47,000	2,490	36.86		21.24	3.20	10.30	3.659	2.968	5.54	4.85	0.54	5.39	19.35
Central Pacific, Western Div.	230	30	80,457	2,682	49.01		15.95					7.51	15.57	0.35	7.51	28.85
Northern & San Pablo Divs.*	104	33	89,702	2,718	35.70		18.08					8.23	17.54	0.51	0.35	7.21
California Pacific Div.*	179	10	25,563	2,556	43.18		24.60					7.42	14.56	0.62	0.75	7.82
Sacramento Div.*	179	10	25,563	2,556	43.18		24.60					5.29	18.05	0.46	0.38	8.88
Truckee Div.*	200	22	74,493	2,660	39.31	91.08	18.38					3.38	19.94	0.38	0.38	8.59
Humboldt Div.*	200	22	74,493	2,660	39.31		20.72					6.48	15.76	0.44	0.31	7.80
Salt Lake Div.*	219	28	92,812	3,200	29.40		17.10					8.32	21.27	0.53	0.27	17.37
Oregon Div.*	151	6	20,535	3,390		43.46	20.07					1.00	10.47	0.37	0.10	7.23
Stockton & Copperopolis.	49	9	6,254	1,741	32.00	60.05	30.35					3.66	7.58	0.28	0.40	7.08
Visalia Div.*	157	17	48,842	2,873	20.44	20.74	16.00					5.80	25.23	0.43	0.60	4.45
Tulare Div.*	170	23	63,565	2,765	26.07	16.73	16.73					4.72	34.17	0.57	0.45	8.09
Los Angeles, San Diego & Yuma Div.*	167	24	61,112	2,546	30.18		14.50					4.93	22.86	0.60	0.98	7.35
Yuma Div.*	249	27	92,247	3,416	40.55		14.90					2.60	23.90	0.63	0.98	8.00
Gila Div.*	248	22	78,139	3,553	50.17		14.02					3.58	17.89	0.63	0.91	7.21
Tucson Div.*	219	25	77,061	3,082	38.31		12.77					3.89	20.57	0.65	0.7	8.34
El Paso & Rio Grande Divs.*	243	31	66,543	2,149	42.51		17.37					2.52	18.51	0.50	0.38	7.78
Chesapeake & Ohio, E'n Div.	208	69	138,159	2,654	27.50	20.00	23.00					2.90	3.70	0.50	0.50	13.99
Huntington Div.*	237	54	160,004	3,020	30.00	19.00	19.00					3.70	3.50	0.60	1.03	13.40
Lexington Div.*	169	17	43,375	2,404	40.50	26.50	16.00					3.10	2.90	0.50	5.80	11.70
Chl. & Eastern Ill. Main Line	106	56	119,633	2,149	32.00	15.00	33.00					2.40	4.00	0.50	3.20	13.00
Terre Haute Div.*	65	56	24,326	33.00		18.00	33.00					3.30	3.30	0.40	4.30	13.40
Cleveland & Pittsburgh*	225															
Dela., Lacka. & Western.	80	27	70,087	2,781		31.60						1.15	5.52	0.56	5.04	6.75
Bloomington Div.*	86	29	66,946	2,308	33.60	13.60	17.20	3.80	0.903			2.35	5.57	0.36	7.07	17.70
Grand Rapids & Ind. Main L'e	382	51	148,371	2,909	31.24	35.00	10.13	3.30				1.91	10.03	0.49	6.06	5.07
Cin. Rich. & Ft. Wayne	102	19	28,400	1,394	35.22		17.04					0.88	8.52	0.53	4.00	5.65
Illinois Central, Chicago Div.	305	90	229,572	2,551	33.86		14.03	5.57	23.27			4.18	5.00	0.28	5.03	15.16
1011 Div.*	101	16	10,412	1,213	30.78		15.86	4.25	18.21			1.71	4.25	0.27	4.82	11.03
North Div.*	345	60	129,246	2,154	27.82		12.60	3.98	14.88			4.22	6.15	0.32	4.76	10.45
Springfield Div.*	113	14	25,185	1,800	36.83		17.21	2.39	13.09			4.63	4.03	0.30	5.22	14.17
Iowa Div.*	189	36	106,090	2,300	29.02		13.39	4.01	12.81			4.45	8.54	0.30	5.00	19.19
Jeff. Madison & Indianapolis	226	43	117,913	2,742	38.07		14.11	3.26	22.07	4.730	0.900	3.35	8.55	0.38	3.18	5.94
Kan. City, St. Jo. & Coun. Bl.	247	38	120,259	3,163	45.10	21.80	4.06	18.30				4.30	4.90	0.39	6.09	15.10
Lake Shore & Mich. Southern.	86		154,858	2,137	34.84	26.90						2.81	7.63	0.24	6.09	10.80
Erie Div.*	136	27	75,914	2,120	31.16	29.07						5.44	7.51	0.29	6.59	19.12
Toledo Div.*	94		190,038	2,021	27.31	22.70						3.48	9.83	0.62	5.07	22.37
Mich. Southern Div.*	929	548	548,089	2,369	36.05	108.00	20.36					3.49	8.67	0.31	6.13	18.80
Little R.R. Mich. Riv. & Texas.	155	14	23,904	1,616		10.00						2.09	4.15	0.68	4.61	14.91
Louis & Nash. First Div.*	141	27	153,417	2,775	27.51	13.53	5.36	18.07	2.720	1.160		3.20	7.01	0.42	5.66	18.81
Second Div.*	200	25	69,442	2,775	27.51	14.45	6.20	16.75	3.240	1.270		3.91	16.75	0.42	5.66	18.81
Memphis Div.*	139	16	44,431	2,778	35.17	15.31	4.11	11.71	3.200	1.190		4.08	6.34	0.39	4.45	17.07
Nash. & Decatur Div.*	122	25	70,087	2,537	29.44	16.47	4.15	14.83	4.140	1.110		5.57	6.95	0.32	4.46	20.75
South & North Ala.*	189	36	106,090	2,325	26.57	15.57	4.13	13.31	2.830	1.030		6.28	6.59	0.41	4.57	20.24
Mobile & Montgomery*	180	30	76,614	2,554	37.24	16.00	4.25	13.34	3.060	1.080		6.35	6.95	0.49	4.40	17.41
St. Louis Div.*	207	33	93,319	2,797	38.54	17.26	3.24	14.57	3.200	1.230		3.39	3.75	0.29	5.74	14.47
Ev. Hen. & Nash. Div.*	135	38	88,540	2,573	45.53	14.94	2.73	14.14	5.650	1.430		3.34	4.99	0.29	4.70	15.72
New Orleans Div.*	124	24	65,415	2,327	42.00	17.81	4.06	10.69	3.580	1.030		4.72	5.42	0.29	6.34	17.71
Pennsylvania & Selma Div.*	134	32	29,151	911	32.59	15.77	3.70	12.81	3.060	1.080		6.40	6.90	0.70	4.40	17.90
Louisv. Cin. & Lexington*	225	38	128,430	2,839	40.78	17.84	1.70	14.08	3.610	1.390		5.06	5.62	0.34	6.44	18.42
Marquette, Hough. & Ont.	225	38	128,430	2,839	40.78	20.48	24.24					3.16	11.10	0.50	5.51	18.43
N. Y. Pa. & O. Eastern Div.*	124	27	270,372	3,466	39.73	13.53	6.50	23.50				1.17	6.59	0.62	6.17	16.55
Pennsylvania & Selma Div.*	134	32	29,151	911	32.59	15.77	3.70	12.81				3.72	7.90	0.44	5.09	17.90
Mahoning Div.*	141	53	15,678	2,457	41.71	18.07	3.3	22.80				4.22	5.52	0.44	4.76	16.34
No. Cent. Rl. & Can. Divs.	147	47	110,651	2,534	27.94	19.23						4.19	5.58	0.56	6.16	17.49
Ohio Central.	123	25	70,087	2,537	38.44	21.08						1.98	3.77	0.34	5.30	11.48
Pennsylvania, N. Y. Div.*	120	126	405,998	3,322	30.49	14.41						6.50	9.90	1.00	17.40	3.06
Amboy Div.*	214	51	113,197	2,210	41.30	11.41						6.40	6.90	0.70	17.40	3.06
Belvidere Div.*	80	11	79,148	1,955	27.93	12.55						4.40	17.90	0.80	16.10	3.06
Philadelphia Div.*	204	170	530,185	2,985	25.78	10.85						5.30	5.90	0.90	12.10	14.03
Middle Div.*	132	104	308,167	2,963	21.23	16.16						3.21	6.90	0.71	17.40	3.06
Altoona Div.*	122	25	33,823	1,850	30.34	14.97						5.30	5.90	0.80	12.10	14.03
Pittsburgh Div.*	204	201	551,489	2,644	25.02	10.78						5.90	5.90	0.90	12.40	14.03
Tyrone Div.*	102	52	114,475	2,291	17.51	13.33						8.40	7.90	0.80	17.10	14.03
Middle Div.*	132	104	308,167	2,963	21.23	16.16						10.10	4.00	0.40	13.50	14.03
West Penn. Div.*	104	22	30,813	1,990	32.62	18.30						3.70	6.90	0.80	17.10	14.03
Lewistown Div.*	132	9	16,167	1,990	25.98	18.38						1.20	4.80	0.60	6.60	14.74
Bedford Div.*	57	4	8,530	2,133	29.58	24.75						1.80	4.40	0.60	0.80	14.03
Frederick Div.*	109	10	22,683	2,908	32.92	12.41						6.90	3.50	0.70	11.10	14.74
Monongahela Div.*	54	14	30,849	2,904	39.92											
Phil. & Balt. Div.*	98	68	106,295	2,887	41.63	10.00						4.40	7.50	0.70	12.60	3.00
Maryland Div.*	98	68	106,295	2,887	41.63	11.17						5.40	8.00	0.80	14.00	3.00
Central Div.*	97	18	38,947	2,164	37.48	11.57						6.90	7.50	0.59	14.90	3.00
Delaware Div.*	97	20	34,008	1,700	42.63											
Pitt. & C. & Ohio Div.*	4	179	500,507	2,706	33.81	15.44						0.99	4.18	0.70	1.73	6.62
Eastern Div.*	290	120	448,586	3,477	31.75	16.59						6.31	12.70	2.220	0.80	5.96
Western Div.*	290	120	448,586	3,477	31.75	16.59						6.31	12.70	2.220	0.80	5.96
Pitts. & St. L. Div.*	197	40	144,748	3,613	41.25	13.17						3.94	5.33	0.61	3.72	5.72
Middle Div.*	247	162	245,128	2,403	26.62	18.30						6.80	4.39	0.53	4.11	5.85
P. C. & St. L. Div.*	163	23	51,949	2,259	32.34	12.11						5.2	10.60	0.80	16.61	5.40
West Jersey*	618	140	386,108	2,758	27.50	14.81						3.39	3.70	0.60	5.30	12.80
Month of March.																
Cesapeake & Ohio Div.*	136	24	86,273	2,332	32.62							3.77	7.02	0.53	6.48	12.80
Year ending March 31:																
Chicago, Rock Island & Pac	1,965	290	9,070,423	33,683	31.08</											